629.1305
AIR

THE AIR LINE PILOT

AUGUST, 1959

In This Issue

Special Reports On The Retirement Question

UNIVERSITY OF ILLINOIS
SEP 9 1959
LIBRARY

Boeing 707 Celebrates 5th Anniversary

THE AIR LINE PILOT

AUGUST, 1959
Vol. 28, No. 8

EDITOR ..... Ed Modes
EDITORIAL ASSISTANT ..... Tom Burns
ADVERTISING & CIRCULATION ..... Dorothy Gramm

Entered as Second Class Matter at the Post Office at Chicago, Ill.

Copyright 1959, by Air Line Pilots Association, International.

In This Issue . . .

SPECIAL REPORT ON AGE QUESTION

The Case Against Compulsory Retirement ..... Page 4
(Why The FAA Maximum Age Proposal Should Not Be Adopted)
Representative Opinion Concerning Aging ..... Page 11
(How Others View The Aging Question)
Senator Goldwater Calls FAA Proposal Unwise ..... Page 27
(A Pilot-Legislator's View Of Age Restrictions)
Arbitrators Reject Age As Retirement Criteria ..... Page 29
(A Report On Two Recent Decisions Involving Involuntary Retirement)
Are Age Limits For Pilots Justified By Facts? ..... Page 32
(A Check List Of Facts Pertaining To FAA's Proposal)

OTHER ARTICLES AND FEATURES

The ALPA Camera ..... Page 15
(Highlights And Sidelights Of The News And ALPA In Pictures)
Unionism And Air Safety ..... Page 16
(How Pilot Unity Has Aided In Improving Air Safety)
Along The Line ..... Page 18
(Features On Interesting Air Line Pilots)
International Performance Regulations ..... Page 20
(A Report On The Development Of International Airworthiness Rules)
The Briefing ..... Page 27
(A Digest Of News And Views In Aviation)
As Others See It ..... Page 28
(Air Line Pilots And Their Profession In The Public Eye)
Flyer's Forum ..... Page 30
(Personal Opinion From Letters To The Editor)

NATIONAL OFFICERS

Clarence N. Sayen ..... President
S. W. Hopkins ..... First Vice-President
R. L. Tuxbury ..... Secretary
D. J. Smith ..... Treasurer

REGIONAL VICE PRESIDENTS

C. C. Spencer, Jr. ..... Region I
E. P. Rordam ..... Region II
C. E. Luther ..... Region III
A. D. Adams ..... Region IV
H. B. Anders ..... Region V

Kay McMurray
Executive Vice-President

Larry Cates
Legislative Representative

Published Monthly by the Air Line Pilots Association, International, Affiliated with A. F. of L.-C.I.O. Publication offices: 55th Street and Cicero Avenue, Chicago 38, Illinois.

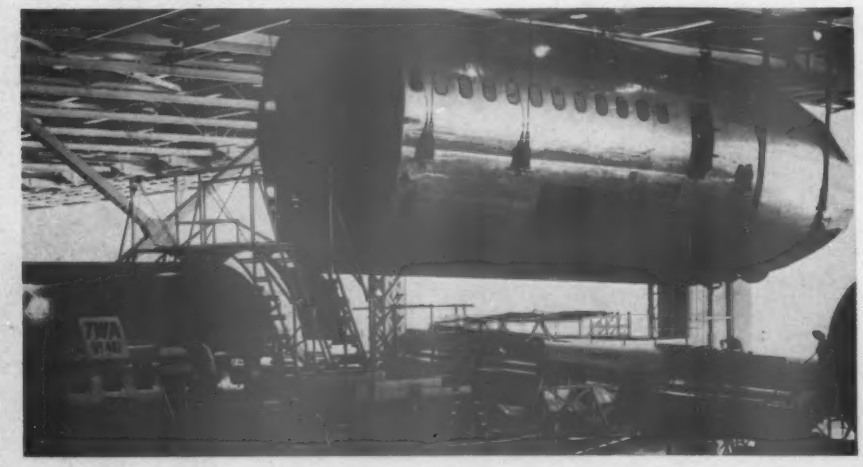
Advertising appearing in this magazine cannot be construed as being an endorsement by the Air Line Pilots Association or The Air Line Pilot.

Opinions expressed by individual authors in The Air Line Pilot do not necessarily represent official ALPA opinion, unless specifically so stated, and therefore should not be construed as such.

Annual Subscription, $2.50.

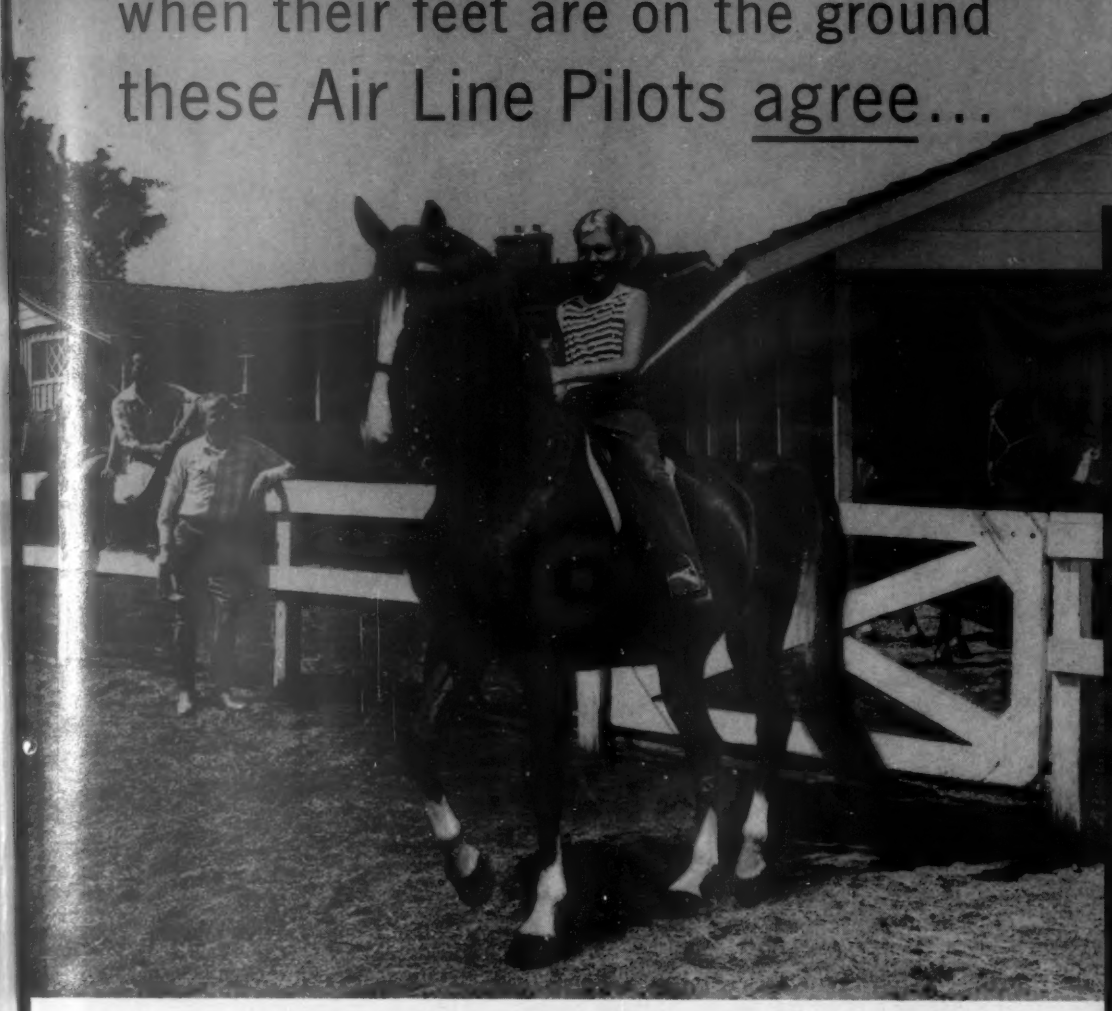
66

On The Cover



THE Trans World Airline's Boeing 707 pictured on the cover is taking off from Chicago's O'Hare International Airport for its flight to San Francisco on July 15th. The date symbolizes the 5th anniversary of the first flight of the 707 from Boeing Field, Seattle. A. M. Johnston, chief of flight test at Boeing, flew the 707 prototype for the first time July 15, 1954. Captain George B. Walker, San Francisco, was at the controls of this TWA jet. Shown at the left is a photo of the company's first 707 on the manufacturing line at the plant, Renton, Wash., as it appeared on the cover of the September, 1958 issue of AIR LINE PILOT.

when their feet are on the ground these Air Line Pilots agree...



JACK CHAMBERS
538 Calle Yucca
Western Airlines

R. L. CURRENT
632 Calle Yucca
Continental Airlines

S. L. HIGGINS
742 Camino Santos Reyes
Western Airlines

JERRY KEELEY
831 Calle Doredo
Western Airlines

JACK MILLER
729 Calle Doredo
TWA

ED MUSSELMAN
751 Calle Yucca
Western Airlines

LYNN RANCH

offers REAL California living at down to earth prices...

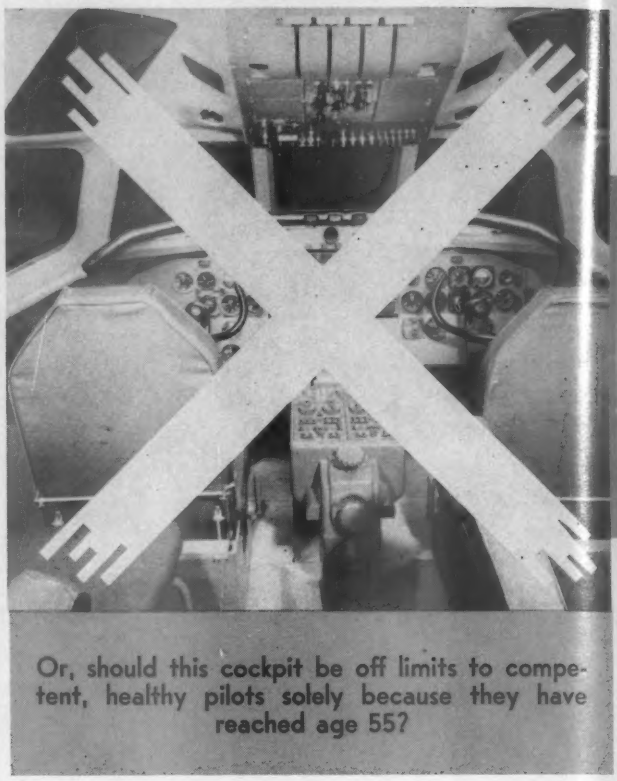
HALF ACRE TO THREE AND ONE HALF ACRE SITES are priced as low as $6,750... *less than most city lots.* And, where else can you provide your family with all these advantages: first ... elbow room in a carefree country atmosphere that allows maximum opportunity for family recreation; second . . . a temperate, smog-free climate the year 'round; third . . . the new Rancho Las Posas eighteen hole championship Golf Course and Country Club* within 15 minutes drive; fourth... miles of hiking and riding trails through picturesque oak studded hills; fifth... membership at nominal cost in neighboring Conejo Oaks pool-tennis court and playground facility;* sixth to infinity... REAL California living... ask the pilots who are already here!

**The Las Posas Country Club and Conejo Oaks Recreation Facility are also Janss Corporation developments.*

PRESENTED BY **JANSS** CORPORATION
DEVELOPERS OF WESTWOOD VILLAGE

Detailed information upon request: Janss Corporation, One West Ventura Blvd., Thousand Oaks, Calif.
or phone (collect) HUdson 5-2175

LYNN RANCH is located less than one hour from Los Angeles' International Airport by freeway . . . five minutes by plane from Conejo Valley Light Plane Airstrip, adjacent to Lynn Ranch.



Proposed Maximum Pilot Age Limit is Not New. It Has Often Been Advanced Before As a Panacea for One Problem or Another and Always Rejected for Lack of Merit.

By Capt. Harry W. Orlady
Chairman, ALPA Physical Standards Committee

Recent FAA draft releases[1] proposing that air line pilots be denied a license after age 60 and that no pilot be allowed to transition to turbo-jet powered aircraft after 55 unless he has already done so, have caused a great deal of comment in aviation circles. However, a chronological age cut-off is not a new concept in pilot licensing. It has often been proposed as a panacea for one problem or another and been summarily rejected each time for lack of merit. In fact, its record of consistent rejection is so impressive that the question of why it is raised again at this time is almost as interesting as the basic question itself. The key probably lies in a review of at least five comparatively recent events in our industry.

▶ The basic reorganization in Federal agencies concerned with civil aviation which was accomplished with the passage of the Federal Aviation Act. A prime reason was our obviously inadequate preparation, particularly budget-wise, to enter the jet age in an efficient manner.

▶ The equally obvious fact that simply changing the name or names of the federal agency responsible would not in itself immediately solve problems which had been too long neglected. The result, of course, is that the transition to the jet age has not always been smooth. There have been air traffic control problems, training problems, crew qualification problems, and many others.

▶ The publicity attending a grievance hearing on a major carrier in which a neutral arbitrator upheld the pilots' position that the company could not arbitrarily and unilaterally select a compulsory retirement age for pilots if questions of physical or technical competency were not involved. It is important to remember that prior to the actual hearings, both sides stipulated that questions of competency were not involved and that company compliance with the award was secured with extreme difficulty.

▶ The tragic crash of a new-model airplane which was being flown by a 59-year-old pilot. This was almost immediately followed by some untimely and ill-advised statements about the "problem of the aging pilot" from certain apparently publicity-seeking aero-medical specialists which were given sensational treatment in some segments of the press. These statements were issued before any factual reports on the cause of the accident were available and before the serious altimetry errors and malfunctions which led to an emergency revision of altimeter requirements on that airplane were discovered.

▶ The drama and publicity attending our entry into the "jet era."

With this background and because of the scare-type publicity and conflicting statements which have surrounded this question, the desire of a new Administrator to clear the air once and for all is perhaps understandable. At any rate, we have this old chestnut with us again, and despite its ex-

1. Civil Air Regulations Draft Releases 59-4, 5, and 6, June 25-26, 1959.

All Studies and Research to Date Only Emphasize . . .

THE CASE AGAINST COMPULSORY RETIREMENT

timely serious potential consequences for both pilots and the industry, the proposal does have its humorous side. For example, seldom outside of *Alice in Wonderland* or *Gilbert and Sullivan* has an industry been confronted with anything like the following. In effect, the proposal says:

***"Mr. Airline President:** Despite the fact that you have trained, competent, and experienced pilots in whom you have large training investments and who periodically demonstrate both their physical and professional competency to our FAA representatives, you can no longer use them if they have reached our arbitrarily selected chronological retirement age. Instead, you will have to make a comparable training investment in another individual to provide a replacement. However, before we will let you use your new man, he will have to pass exactly the same physical and proficiency tests which were passed by the man we will not let you use. This is necessary in the interest of safety. In addition, because of the new pilot's lack of air line captain experience, we may require additional training and supervision for him. We also may have to temporarily penalize your operation by requiring him to remain on higher than normal weather minimums while he is gaining that experience. Remember, too, we may not always use these particular ages for there are many others we could pick in an equally arbitrary fashion which would be equally easy to defend."*

***"As for you Mr. Pilot,** despite the fact that yours is the only profession which requires continued demonstration of physical and professional competency and despite the fact that you can and do demonstrate that competency to our agents in an entirely satisfactory manner, you can no longer fly after reaching our arbitrarily selected chronological retirement age. Unfortunately, it is not possible to measure your functional age chronologically so we will still have to require your periodic physical and professional competency checks. I know this is a bit difficult but it may be easier if you will but realize and understand that your ability to do your job safely and efficiently has nothing to do with your disqualification."*

"Additionally Mr. Pilot, in the future you will no longer be allowed to prove your ability to keep up with your industry and profession if you have reached another of the magic numbers, in this case, 55. I know several of your brother pilots in that category have already demonstrated they could do it. However, I am sure you can understand that we will obviously have to let them continue to fly for we would look a bit silly if we maintained they could not do what we have already certified they could."

In a more serious vein—this draft release unfortunately has created a false impression regarding present pilots and procedures, and understandably a considerable amount of apprehension among pilot groups. It is equally unfortunate that circumstances could cause a proposal with the following characteristics to be seriously advanced by a Federal Agency responsible for the promotion and advancement of Civil Aviation in our country.

- It assumes that chronological age is synonomous with functional and physiological age. The proposed disqualifications are for physiological and functional reasons. Yet the calendar is the only measure of these capacities the proposal would accept. This premise offends ordinary common sense. It also is strenuously opposed by organizations ranging in scope from the U. S. Departments of Labor and Health, Education, and Welfare through professional Sociological Societies to such scientific organizations as the Gerontological Society and the American Medical Association. In fact, we know of no responsible organization which supports it.

- The actual performance record established in our industry contradicts the basic premise.

- In some quarters the proposal is being advanced using propaganda techniques and scare tactics which prey on the emotions and popular misconceptions of the general public in a manner worthy of a first-class demagogue. This, despite the fact that it is being advanced in the name of public safety where issues should be evaluated with scientific objectivity and detachment.

- Without any basis in fact it assumes the procedures established by the Administrator to assure the physical and technical competency of pilots are not adequate, reflecting directly upon either the standards and procedures themselves or the individuals who administer them.

These are rather strong statements and certainly require elaboration. First, however, I should like to state and

briefly discuss the fundamental premise underlying Association policy in this area. This premise is that the maintenance of high physical and professional standards is an inherent part of an air line pilot career. A pilot who cannot meet proficiency and health standards should leave the cockpit (and does under existing procedures) whether he is 35, 45, or any other age. If there are isolated instances where this has not happened it is because the individuals who have been given the responsibility of enforcing standards by the Administrator are not doing their job.

Recently some rather irresponsible statements by people we had hoped would be better informed have appeared in the press. They have, among other things, alleged that "strict union procedures" have forced the check-out of incompetent pilots on the jets. With little reflection it should be obvious that these people:

- Are ill-informed about ALPA policies and procedures in this area.
- Have at best a provincial knowledge of air line training problems and procedures.
- Unwittingly slander those agents of the Administrator who have certified the competency of these individuals. (Every pilot flying in jets or any other aircraft has been examined and certified by both his Company and the FAA. Agreements between companies and their pilots require only that the senior men be given an *opportunity* to qualify on new airplanes if they desire to do so. If they are unable to qualify they suffer the consequences. It is that simple.)

Chronological Vs. Functional Age

There has been speculation about how long a pilot should fly from almost the beginning of aviation. At one time many thought flying was a "young man's game"—like professional baseball or championship tennis. This was an easy assumption to make because the industry was young and there just were not any "old" pilots. However, as the air line industry developed, informed people began to realize that the primary attribute of the air line pilot, in addition to basic flying skills, was not the physical condition of a college athlete but mature skill and judgment developed through experience. It was obvious that many earlier ideas were erroneous. While the basic question was occasionally debated, older pilots kept right on flying, checking out first on new runs and equipment, and providing a daily demonstration of their ability to continue doing their job safely and efficiently. Those unable, and this included pilots in all age brackets, were eliminated.

Finally in 1952, the aging question received official attention from the Doolittle Airport Commission. It had been appointed by President Truman as a result of the tragic series of air crashes in the vicinity of Elizabeth, New Jersey. These crashes ultimately led to the development of more reliable propeller circuitry and considerably reduced the problem of inadvertent propeller reversal at high power.

Dr. W. R. Stovall, then Chief of the CAA Medical Division, has recalled, "Early in 1952 General Harry G. Armstrong, in his capacity as president of the Aero Medical Association, and I as president elect, requested the Doolittle Airport Commission to consider the civil medical problem, since we believed that it was pertinent to their field of inquiry. General Doolittle in turn requested the authoritative medical opinion of the President's Health Resources Advisory Committee . . . [which] . . . made forceful recommendations to General Doolittle, and in consequence the Airport Commission recommended the pilot aging study with which most of you are familiar.

"This recommendation has fared better than myriads of other committee recommendations. It has been incorporated as part of the President's National Air Policy and the Secretary of Commerce has been directed to collaborate with the Aero Medical Association, the Civil Aviation Medical Association, and the Flight Safety Foundation in the study of this and allied problems."[2]

The Aero Medical Association appointed a committee of distinguished specialists in aviation which studied the "problem of the aging pilot" over a period of several years. Essentially their conclusion was that this "problem" is so highly individualized that they were unable to relate a pilot's functional age to chronological age with a validity acceptable to them as medical scientists.

The reason is quite simple: The calendar is not a medical instrument of sufficient reliability and sensitivity to conclusively determine an individual is incapable of flying an airplane safely and efficiently. The magnitude of individual differences make it impossible. This is particularly true if the individual is inconsiderate enough to demonstrate that he can meet accepted physical and technical competency standards established for the purpose of determining his ability. This principle has been publicly stated by many experienced specialists in aviation medicine, particularly by those who have worked with air line pilots, and in more general terms by other well-qualified individuals studying the broader aspects of the aging problem. The appendix to this article contains several representative comments chronologically arranged. They are particularly impressive because of the virtual unanimity of opinion consistently expressed over a considerable period of years. Some of these comments are by the Medical Directors of air lines which have a company policy of pilot retirement at age 60 or of retirement at age 60 unless special permission to continue flying is secured. It would be misleading to state that these individuals are advocating a change in their company's policy. What they are saying seems essentially that there have been no medical problems with their policy and that functional age cannot be measured chronologically. They have not stated that they would have had problems if that age were 61 or 63 or 65. This, I think, illustrates an extremely important point. It is that the determination of a chronological retirement age for pilots is not a medical-licensing question. The medical-licensing question is the determination of physiological or functional age. The same standards which force "early" retirement from flying at 35, 45, 50, or any other age are precisely the standards which logically permit pilots to continue flying after 60 if they can continue to meet them. We have neither seen nor heard of any medical evidence which suddenly invalidates those standards at the stroke of midnight on the 60th birthday, as dramatically as Cinderella's coach again became a pumpkin. See Appendix, Page 11.

Statistics and the Safety Record

If these indeed are well-qualified people and they have been sincere in what they have said and written, it would seem rather difficult to support these proposals. However, the FAA is required to promulgate regulations assuring "safety in flight in air commerce". Because these cut-offs have been proposed in the name of safety, it seems reasonable to suspect there must be something in the records which contradicts the testimony of the experts. However, this creates a real problem for the experts are clearly supported by the record. It is the proposal which is contradicted and conclusively. For example:

From 1946 to January 1, 1959, there were 87 aircraft accidents involving commercial airliners according to the

2. Stovall, W. R., M.D., Chief, Medical Division, Civil Aeronautics Administration, "Federal Concern with Aviation Medicine," February 18, 1955.

CAB. Twenty-seven of the accidents were attributed by the CAB to the commanding pilot. In these mishaps, one captain was in his 20's, sixteen were in their 30's, nine were in their 40's, and the eldest was 50. From 1946 to the present, the CAB reported there have been only two fatal airliner accidents involving captain pilots 50 years or older. No incident or accident has been attributed to the age or physical breakdown of the pilot. While pilots have died in flight, none have been over 55.[3]

Of course, one has to be careful with statistics and it is equally true of these. One problem is the age distribution of air line pilots. There are many more pilots in the younger brackets. Solely on the basis of their numbers one would expect the greatest percentage of accidents to fall in those age groups. A study by the CAA Office of Aviation Safety published in 1956 considered this question and attempted to discover "trends in accident rates with pilot age". Even after weighing accidents and numbers of pilots in each age group to provide an equal basis for comparison, no statistically significant trends were discovered.[4]

In evaluating the safety records, a particularly relevant factor seldom given consideration is that the older and more senior pilot's privilege of flying the new equipment also require them to fly it during its introductory period—while equipment, procedures, and training programs are being modified and evaluated. For example, included in those statistics was Everett McMillan, killed while attempting an emergency landing at Bryce Canyon. This crash led to the grounding of an entire fleet of new airplanes until their fuel system could be modified to prevent uncontrollable in-flight fires. Also included was 59-year-old Al DeWitt, who recently crashed in East River while making a back-course approach at LaGuardia Airport. While the official "probable cause" of this accident has not yet been announced, the Co-pilot and Flight Engineer who survived both testified that each of the new-type altimeters installed in the airplane were reading about 600 feet just prior to impact. The FAA ordered the immediate installation of a conventional barometric altimeter on a new model[5] and stated that landing minimums would have to be raised on existing

3. Sterling, Robert J., "Age of Airline Pilots No Problem As Yet, Experts Say," United Press International, Washington, D.C., April 5, 1959.

4. The Age Distribution of Captains in Air Carrier Accidents, Office of Aviation Safety, Civil Aeronautics Administration, U. S. Dept. of Commerce, July, 1956.

5. FAA Directive 59-#19, February 20, 1959.

Pilot Physical Standards Have Been Studied by ALPA for Many Years. The ALPA Physical Standards Committee was First Formed in 1955 to Study and Monitor Health Problems. It has Been Unable to Establish Any Health Problem Related Solely to Chronological Age.

The So-Called "Aging Air Line Pilot" was Discussed in Great Detail At The 1956 Aero Medical Convention in Chicago. The Author of This Article (left) is Shown With Thomas A. Coates, M.D., Member of the Executive Council of the Aero Space Medical Association; G. J. Kidera, M.D., President Elect of the Aero Space Medical Association and UAL Medical Director, and Gerald Backenstoe, Former President of the Civil Aviation Medical Examiners Association.

Members of the ALPA Physical Standards Committee Attended the 4th Annual Post-Graduate Course in Aviation Medicine at Ohio State University in 1957. ALPA Sponsored the Nation's First Two-Year Graduate Civil Aviation Medicine Fellowship in 1957 and Again in 1959.

Retirement Age Was Thoroughly Studied by ALPA Advisory Retirement Committee Here Reporting to 1954 Convention. Their Views: Retirement Should Depend on Solely Three Factors; i.e., (1) Desire, (2) Competency, and (3) Health.

airplanes which were not retrofitted. In the East River crash there are other possible contributing factors such as the lack of approach lights or a glide slope. However, it seems entirely reasonable to say that both of these "senior" pilots would be alive today if they had not been senior enough to be flying a new-model airplane as it was being introduced.

Potential Pilot Incapacitation

All of this would appear to make the age 60 cut-off for pilots rather difficult to defend. However, the proposal states, "despite the fact that knowledge of the aging process specifically related to piloting aircraft is incomplete, certain applicable observations have been made and generally understood." It later explains that primary concern is over the possibility of pilot incapacitation and states, "The death rate from heart disease, for example, has been found to be 10 times greater for persons aged 45 to 64 than for those aged 25 to 44. By age 65, cardio-vascular disease (including heart disease) causes more deaths than all other medical conditions combined."

On this sort of evidence the reasons which make age 60 and not 58 or 62 or 47 the magic number are a little obscure unless you just happen to like multiples of 10. There are, of course, more serious objections. For example, unless those statistics were taken from a sample group comparable to air line pilots, there is considerable doubt as to their applicability. This is particularly true since the adoption of an electrocardiogram requirement for all Class I pilots over 40. It was adopted in order to detect those individuals who have suffered an initial attack or myocardial infarction because, as was explained in the Draft Release (59-I), "Statistically it has been shown in long-term studies that among individuals who have survived initial attack, annual mortality rates are from three to fifteen times greater than the mortality rate for the general population of the same age. This increased mortality is largely due to recurrent attacks of myocardial infarction."

It would therefore appear that if those susceptable individuals were screened out (by the EKG), the mortality rate of those remaining would be significantly lower. When instead they are lumped into an overall general population category and then tied to specific chronological ages the clear blue flame of scientific objectivity develops a rather noticeable flicker.

This does not mean that potential pilot incapacitation is not a valid safety problem for it does occur and with greater frequency than might at first be believed. Interestingly enough, in-flight incapacitations include not only such dramatic incidents as "death in the cockpit" but also a host of ordinary every-day things — things, however, which can be as operationally incapacitating as they are ordinary. The Association has conducted what, to our knowledge, are the only detailed studies on this problem and as a result of these studies and the operational experience available to it have concluded:

- There is no relationship between pilot age and in-flight incapacitation.
- Pilot incapacitation may occur at any age and to any pilot.
- The main causes of pilot in-flight incapacitation are such mundane occurrences as acute indigestion, diarrhea, food poisoning, etc.
- In-flight incapacitation is not predictable.
- *The only positive protection is the fail-safe crew.*

This concept has been recognized for the aircraft, its engines and components by regulation for many years and should be extended by regulation to the crew. Mechanically, this "fail-safe" concept provides for alternate components to take over when one fails. For example, if one engine fails, under federal regulations, the remaining engines must be capable of sustaining flight. From a flight crew standpoint, therefore, it requires a fully qualified and trained copilot to take over when the pilot-in-command is disabled or, as has happened, dies in flight. On large airplanes it also requires that the third crew member be qualified to relieve the copilot.

Originally, the copilot was added to the crew in aircraft which could be flown by one pilot in order to provide relief for the pilot and provide a margin of safety in the event of his incapacitation. However, government regulations have lagged behind the development of aviation. It now requires two fully qualified pilots to operate modern high speed aircraft utilizing today's navigation, communication, and air traffic control system even under routine conditions and when assisted by a third crew member. Yet, government regulations do not require that the copilot be qualified to operate the particular aircraft on which he is serving as copilot or that the third crew member be qualified to fly at all. On June 26, 1959, FAA issued a notice of proposed rule making requiring that copilots hold type-ratings on the aircraft they fly and periodically demonstrate their proficiency.[6] This rule should be adopted as soon as possible.

For years many air lines have exceeded federal regulations and required the third crew member to be a pilot. As a result of Association programs, all air lines now carry three pilot-qualified crew members on jet aircraft. FAA regulations still do not establish such a requirement. Yet if the problem of in-flight incapacitation is to be squarely faced, the factors which cause much the greatest percentage of incapacitations must also be considered. To continue to avoid them lends comic-opera status to the entire process.

Other Considerations

A major factor seldom considered when national or selected group averages are applied to pilots is the natural process of selectivity and elimination which is an inherent part of being an air line pilot. This process begins with initial employment and continues

to the very end of each pilot's career. For example, Dr. G. J. Kidera, Medical Director of United Air Lines, told the 23rd Annual Meeting of the Aero-Medical Association that in a particular period surveyed only 99 out of 2366 applicants for pilot employment successfully completed the pre-employment screening tests necessary for assignment to the UAL Flight Training Center.[7] An example of this process at work at the other end of pilot careers was given to the 25th Annual Meeting of that Association by the late Dr. Howard L. Edwards, then Medical Director of Eastern Air Lines, who told that meeting that nearly one-fifth of their aging pilots voluntarily retired from flying between the ages of fifty and sixty.[8] Of course, there can be a variety of reasons for early retirement. Among them might be advancement to more lucrative positions, physical reasons, "tired of flying," loss of competency, or many others. However, the individuals who remain are a highly select group, for purposes of their job, in terms of motivation, competency, and physical condition. An idea of the extent of this process is given in a study made on a major airline which revealed that in a 14-year period 196 out of a total of 699 on the system seniority list were no longer active pilots. Only three actually flew schedules until age 60. Another example is cited by Dr. Ross McFarland who has reported that a 1948 survey of the first 500 members of the Air Line Pilots Association revealed that only 29% of them were still active line pilots. 22% had been promoted to executive status, 31% were no longer with the airline and 18% had died from natural or accidental causes.[9]

Additional evidence was cited in the April 1954 AIR LINE PILOT by Captain S. J. Devine then Chairman of the ALPA Pilot Retirement Committee. Captain Devine reported, "The preliminary findings of the Committee indicate that the rate of attrition of the air line pilot group (excluding probationary pilots) approximate 3% per year. More amazing is the age of those included in the 3%. In 89% of separations studied so far, the pilot has been less than 40 years of age! Of a given group of 100 copilots, 25 years of age, only 10 will have a mathematical chance of flying until age 55."[10]

At a much earlier date, Captain A. F. Foster had been concerned with this problem. On May 7, 1948 he told the Third Meeting of the ALPA Executive Board, "It is a sober fact that on July 1st of last year there were just 55 members of the Air Line Pilots Association who were 50 years of age or over and were still active pilots. . . . Further, there were only 109 other members who were active flyers who were between 45 and 49—a total of 164 pilots who were 45 and over on July 1 last year. These were the survivors of 317 pilots 90 months earlier, a net dropping out of 48.3 percent."[11]

While these surveys are not strictly comparable because they covered different periods and may not have used identical criteria, they do provide rather graphic illustrations of the continual process of elimination which is a part of this profession. Whether reasons for these eliminations were voluntary or involuntary, or for personal, competency, or physical reasons is largely irrelevant. The facts are simply that those who remain are a highly select group. Any attempt to equate them with the general population in areas influenced by this selectivity, such as general physical condition, should be seriously questioned.

This latter point was illustrated by Dr. Kidera at the 107th Annual Meeting of the American Medical Association. Dr. Kidera's study covered 100 senior air line pilots over a 20-year period. Considering the Administrator's concern with cardiovascular problems and the generally accepted fact that overweight and high blood pressure are two of the major factors believed to increase susceptibility to heart attacks the following paragraphs from Dr. Kidera's paper are especially interesting:

> ". . . In reviewing weight gain it was anticipated that a rather sizable increase in weight over the 20 years would be found. This was not the case. Weight in 1937 averaged 157½ lb. (71.4 kg.), with a variation between 211 and 127 lb. (96.2 and 57.6 kg.), while in 1957 the average was 169½ lb. (76.9 kg.). The heaviest man weighed 221 lb. (111.2 kg.) and the lightest 136 lb. (61.7 kg.). An average weight gain of 12 lb. (5.4 kg.) during a 20-year span was considered excellent. This is further emphasized in the light of a report by Captain Huber of the U. S. Navy. (Huber studied a group of Navy pilots and found an average weight gain of 29 lb. (13.2 kg.) per man over a 10-year period). . . . "Pulse rate, blood pressure, and vital capacity were periodically determined, and in 1937 and 1957 the average compared as follows: pulse rate, 65.9 and 65.5 per minute; blood pressure, 114/72 and 115/78 mm. Hg (ranges, 96/56 to 154/78 in 1937 and 98/58 to 158/84 in 1957). . . . The highest recorded blood pressure was 158/84 mm. Hg; this occurred on a single reading, in 1957, in the same man who, in 1937, had the highest reading, 154/78 mm. Hg. Similarly, the man who, in 1937 had the lowest blood pressure recording, 96/56 mm. Hg, also had the lowest reading in 1957, 98/58 mm. Hg. . . ."[12]

The Transition Cut-Off

Another apparent concern is the ability of pilots over 55 to successfully transition to turbo-jet aircraft. The safety reasons for this concern are a bit difficult to determine for present procedures prevent any individual regardless of age from flying a new aircraft until his successful transition has been approved by one of the Administrator's agents. Additionally, many pilots over 55 have already satisfactorily demonstrated that they can successfully make that transition. This is acknowledged in the provision proposing that they continue to fly. However, concern is still there for all other pilots would be denied an opportunity to prove their competency. In support of this position the draft release states, "in general, abilities to perform highly skilled tasks rapidly, to adapt to new and changing environmental situations, to resist fatigue, to maintain physical stamina, and to perform effectively in a complex and stressful environment begin to decline in early middle life and continue to decline at a fairly steady rate thereafter". All of this sounds fine until one remembers:

- The obvious problems encountered in applying broad generalities to specific individuals.
- The continuing and inherent selectivity process in terms of motivation, competence, and physical condition which are part of a pilot career.
- The fact that "abilities to perform [specific and applicable] highly skilled tasks rapidly, to adapt to [specific and applicable] new and changing environmental situations, . . . and to perform effectively in a [specific and applicable]

6. Civil Air Regulations Draft Release 59-3, June 25, 1959.
7. Kidera, G. J., M.D., "Airline Medical Examiners and CAA Forum," **Journal of Aviation Medicine**, (October, 1952) 503.
8. Edwards, Howard K., M.D., "The Aged and Retiring Pilot," **The Journal of Aviation Medicine**, February, 1955, 73-75.
9. McFarland, Ross A., Ph.D., **Human Factors in Air Transportation**, New York, McGraw Hill Book Co., Inc., 1953.
10. Devine, S. J., "It's Ten to One You Can't Make It," **The Air Line Pilot**, April, 1954, 7.
11. Foster, A. F., Statement before ALPA Third Executive Board, May 7, 1948.
12. Kidera, G. J., M.D., "Twenty-Year Study of Physiological Measurements In One Hundred Senior Airline Pilots," **The Journal of the American Medical Association**, November 1, 1958, 1188-1190.

Pilots Who are Able to Meet Proficiency and Health Standards Can and Do Fly Safely Beyond Age 60. NWA Captain Deke DeLong (2nd from Right) Only Recently Retired at Age 65 With an Excellent Record as a Pilot.

complex and stressful environment" are among the abilities pilots are required to demonstrate in their periodic en-route and competency checks. This is particularly true on those airlines which have simulator programs where emergency situations considered too dangerous to practice in an airplane are routinely performed.

▶ That the ability "to resist fatigue", and "maintain physical stamina" is epitomized by Max Conrad who, at 56, recently set a new non-stop distance record for small planes. He flew 7,688 miles solo in slightly over 58 hours and regularly ferries small planes to Europe, frequently non-stop and solo.

Simple logic suggests that this proposed rule, providing a pilot who has reached his 55th birthday shall not be checked out on jet aircraft, is obviously based upon economic rather than safety factors. For example, a pilot checked out on jet equipment on the day before his 55th birthday is completely legal, under this proposed rule, to fly in command in jet equipment for 5 years, i.e., until his 60th birthday. However, the same proposed rule would prohibit the same pilot from flying the same jet equipment if he was checked out *one day later!* Thus any one of the infinite circumstances that might delay a pilot's check-out by a single day would under this proposed rule render legally incompetent a pilot who would otherwise be legally competent. Such a rule cannot be justified for reasons of safety and is obviously inequitable.

An additional effect would be a severe economic penalty on all pilots. There are many reasons for this. Air line piloting is an occupation by means of which pilots earn their living. Unfortunately, by the time the air line pilot approaches his 55th birthday, he is for all practical purposes committed to this occupation. It is in most instances extremely difficult, if not impossible for the air line pilot to secure equivalent compensation in some other field. Therefore, the economic impact of this proposed rule also deserves careful consideration. Collective bargaining agreements covering pilot pay throughout the industry provide that a pilot's last productive years are economically the most rewarding. His opportunity to qualify for and fly larger, faster and more productive equipment is enhanced by his relative seniority. Naturally, the pay rates for flying such equipment are higher than rates applicable to other equipment. It necessarily follows that to deprive a pilot arbitrarily of an opportunity to increase earnings which he otherwise would have is patently unfair.[13] To deprive a pilot of that opportunity by means of a Governmental Rule without basis in Safety or Operational Requirements would prostitute the rule-making function and give governmental approval to a procedure which is repugnant to basic principles of equity. Any such rule is so obviously an industrial relations problem that it can only be properly processed under the Railway Labor Act.

There is still additional evidence that this proposal is inspired by operational economy rather than operational safety. It does not even pretend that an air line pilot, otherwise qualified, is competent to operate jet equipment before age 55 but not afterwards. A pilot can, under the proposed rule, operate jet equipment for five years after his 55th birthday. It seems obvious that the real basis for the rule is that its sponsors have arbitrarily determined that five years is the minimum period over which the cost of an air line pilot's jet training can be amortized. The only standards or criteria by which this conclusion could be reached are economic. They have absolutely no basis in safety. Thus, under the guise of safety, the proposed rule invades an economic area in which the pilot is guaranteed the right to protect his interests by bargaining collectively with his individual employer under the Railway Labor Act. It threatens to deprive him unilaterally and arbitrarily of the benefits of his most economically productive years.

In summary, there is no group or organization in the country with a greater or more direct interest in air safety than the air line pilots. To ignore a valid problem would be unthinkably shortsighted. However, the cause of air safety is not served by "tilting at windmills" in areas which do not meet the acid test of reality, regardless of how attractive they might appear on the surface. Ours is a very realistic business. Refusal to recognize that fact, in addition to wasting funds and effort, prevents concentration on the real problem areas. In this particular case, while a public airing of the so-called "problem of the aging pilot" may be helpful in clearing the air regarding this question, there are some real dangers, particularly if emotionalism and sensationalism become involved. The facts seem this simple:

▶ Chronological age does not adequately measure functional or physiological age.

▶ Present standards and procedures reflect functional or physiological age and therefore disqualify pilots regardless of their chronological age. This happens at 30, 45, 50, or any other age. These standards and procedures do not lose their validity at the stroke of midnight

13. It is very easy to underestimate the economic impact of a proposal which deprives a pilot of five years of his peak earnings and at the same time retires him five years sooner than he would otherwise have left the industry. Each case, of course, should be computed individually, however the following assumptions provide a typical example:

1. Pilot began his airline career at age 30 (1934).
2. Is now 55 and senior enough to fly jets.
3. Average salary 30-55—$12,000 a year.
4. Average salary 55-60—$28,000 a year.
5. Assured Pension Program negotiated 1955.
   "A" Fund .75% of first $3,000
   1.5 % of excess over $3,000
   "B" Fund 4% of salary Company contribution
   4% of salary Pilot contribution
   Past Service Credit—10 years.

A. Gross Worth of Career ended at 55.	
1. 25 years at $12,000 =	$300,000
2. Pension payments (23 years life expectancy)	36,666.14
Total	$336,666.14
B. Gross Worth of Career ended at 60.	
1. 25 years at $12,000 =	$300,000
2. 5 years at $28,000 =	140,000
3. Pension payments (18 years life expectancy)	97,108.20
Total	$537,108.20
Gross Worth of Career ended at 60	$537,108.20
Gross Worth of Career ended at 55	336,666.14
Difference	$200,424.06

Therefore, if this typical pilot were forced to retire five years early and were deprived of five years of peak income, his total career earnings would be reduced to approximately 60% of his normal career potential. (Source of data ALPA Statistical and Research Department.)

on the day a pilot reaches his 55th or 60th birthday.

▶ The problem of in-flight incapacitation is a valid problem and it has not been squarely faced. The majority of cases are temporary in nature, not medically predictable, but nevertheless operationally incapacitating and a definite safety hazard. (Acute food poisoning can be more disabling than some heart attacks.)

▶ The only practical way to get positive protection against in-flight incapacitation is to:

- Maintain present physical and proficiency standards providing for the individual testing of individuals.
- Provide a fail-safe crew wherein, on large aircraft, any pair of flight crew members can safely function in normal or emergency situations in the event of an in-flight incapacitation.
- Provide an integrated program of initial and recurrent training for all crew members.

Appendix of Representative Opinions on Pilot Aging and Broader Aspects of Aging Process

1949

1. The January 24, 1949 issue of TIME reported "Last week Psychologist Ross A. McFarland of Harvard's School of Public Health told the Gerontological Society in Manhattan that a pilot is as old as his vision, or his 'motor skill', or his general ability to adjust to the demands of his job. No exact age limit should be set for pilot retirement . . .".[1]

1952

2. In March of 1952, as a member of An Air Line Medical Examiner and CAA Forum panel held in connection with the Aero Medical Association Convention of that year, Dr. G. J. Kidera, Medical Director of United Air Lines, was asked at just what age a pilot becomes unsafe for flying. Dr. Kidera replied, "I recently participated in a panel at Randolph Field and the subject there was, 'At What Point Does Experience No Longer Compensate for Physiological Change or Aging,' and we had some excellent comments. Of course, unfortunately, I don't know how anybody can possibly come up with the answer with what we have at hand. . . ."[2]

3. "Even within the same species there is considerable variation in the rate of aging change between different individuals. All of us are aware of the fact that we know people who are biologically, mentally and functionally relatively young at 70 and others who are relatively senile in their early fifties.

"Furthermore, there are qualitative as well as quantitative differences in the ability to learn. It has been demonstrated that though it takes older individuals longer to memorize a given paragraph than it does younger persons, their recitations are usually more accurate. Though speed is lost, accuracy is increased. This change in the qualitative nature of memory is most important in relation to employment of older individuals because there are many positions requiring accuracy, persistence, and endurance in the long, steady grind of competitive existence . . . [3]"

4. "Most of the detriment, most of the depreciation which occurs in later years is unquestionably due to the cumulative injuries of chronic and progressive diesease rather than to aging per se."[4]

5. "It has been shown also that the process is a very gradual one, that it differs widely among individuals, and that there are variations in the rate of aging of different organ systems within the same individual."[5]

6. Conclusions reached at a conference on "Retirement of Older Workers" held at Columbia University, January 24-26, 1952 were published. They included the following:

"Physiological age bears a much closer relation to working ability than chronological age and currently attempts are being made to formulate reliable methods of testing physiological age . . . but even if tests . . . prove feasible there will still remain the extremely difficult problem of correlating maximum physiological capacities with working performance. At the present time it appears that the only criterion of ability to keep on working which may be realistically applied to the aging worker in industry is that of actual performance on the job.

"In conclusion it should be emphasized that no account of the changes in senescence is valid which does not stress the wide range of individual variations to be found. Psychologically as well as biologically, functionally, as well as pathologically, there is no 'typical' aged person."[6]

1953

7. On May 12, 1953, Dr. John A. Tamisea presided over a CAA Forum on problems on the aging pilot which was held in conjunction with the Aero Medical Convention. Their panel included flight surgeons from the armed forces and also air line medical directors. Again the consensus was that chronological age is not an adequate measure of the time a pilot should stop flying.

8. 1953 also saw the publication of Dr. Ross McFarland's book HUMAN FACTORS IN AIR TRANSPORTATION. One of his chapters is entitled "Aging and Deficiency in Airmen." In its summary, Dr. McFarland states, "Insofar as mental ability is concerned, there are definite changes in such functions as ability to learn, memory, reasoning, and judgment, especially in relation to speed or ability to deal with complex factors within given units of time. Compensation takes place for every deviation, however, and if certain capabilities diminish others are enhanced. Thus, if a fairly profound decline sometimes occurs, compensation and changes in method often result, so that final achievement changes relatively little or at times may even increase. In regard to undertaking new tasks or duties, various studies show that attitude and motivation are often as important in the end result as deterioration in innate capacities." He also states, "In reviewing typical problem cases among the older pilots, it was found that most difficulties were attributable to the accentuation of defects already present, to flying experiences, or to personal adjustments rather than to the variable of age alone. Until more experience is gained, it would be unwise to set an arbitrary upper age limit for retirement from flight duty; each case should be judged on an individual basis. . . . But in each case, functional age or fitness to perform their required duties efficiently and safely should be made the basis for retirement from active flight duty rather than chronological age."[7]

1. McFarland, Ross A., Ph.D., "Nobody Gets Younger," **Time**, January 24, 1949, 75.
2. Kidera, G. J., M.D., "Airline Medical Examiners and CAA Forum," **"The Journal of Aviation Medicine,"** October, 1952, 497.
3. Carlson, Anton J., Ph.D., and Steiglitz, Edward J., M.D., "Physiological Changes in Aging," **Annals of The American Academy of Political and Social Science**, Vol. 279, January, 1952.
4. Ibid.
5. Tibbitts, Clark and Sheldon, Henry D., Introduction to "Philosophy of Aging," Annals of The American Academy of Political and Social Science, Vol. 279, January, 1952.
6. Mathiasen, Geneva, **Criteria for Retirement of Older Workers**, New York, Putnam, 1953.

9. Dr. Wayne Dennis, of the American Institute for Research, stated in his AGE AND BEHAVIOR, A SURVEY OF THE LITERATURE, that its purpose was the "Assembling and the Presentation of Presently Available Information on Psychological Changes with Age." In his precis, Dr. Dennis summarizes his findings and includes the following caution: "While the findings just reviewed are reasonably well-established, throughout this survey several cautions with regard to these findings have been emphasized. Some of these cautions are as follows:

"a. Most of these findings are based upon cross-sectional rather than longitudinal data. While cross-sectional data can show, for instance, that 20-year-olds today differ from today's 50-year-olds, they do not show what the present 20-year-olds will be like 30 years hence. Our present differences between age groups may be the result not of age but of differences in education, experience, social outlook, etc. To study changes with age requires a longitudinal approach.

"b. Many studies show psychological loss with age. In interpreting this fact, it should be kept in mind that most of the studies employ relatively simple tests, and, frequently, tests devised originally for use with young people. A systematic search for performances in which older persons excel might result in a greatly revised picture of the later years.

"c. Where psychological losses are established, the vocational significance of these losses usually is not established. For instance, it is relatively well established that older persons cannot repeat after one presentation as long a list of unrelated words and digits as can younger persons, but whether a reduction in memory span from seven items to six items is critical for any occupation is unknown. We need to know what behavior changes have occupational relevance.

"d. Even when a psychological loss is shown to have occupational relevance, this relevance may hold only for the present work conditions, plant layout, machine design, etc. The possibility of changes in human engineering which may more than compensate for psychological changes should be considered.

"e. Furthermore, psychological changes themselves should not be regarded as inevitable. If a psychological loss occurs, attention should be given to the possibility that such loss can be prevented by special training or by improving environmental conditions.

"f. When attention is paid to differences between averages of age groups, sight should not be lost of the individual scores which make up these averages. All studies show that persons of any age vary greatly. *As a result, one will find that even though, in some regard, the averages of 20-year-olds and 70-year-olds may be quite different, nevertheless many of the 70-year-olds will earn the same scores as many of the 20-year-olds. Individual differences are much greater than our age differences.*"[8] (Emphasis supplied.)

1954

10. On September 22, 1954 while discussing "The Aging Pilot" at a meeting of the French speaking branch of the Aero Medical Association at Zurich, Switzerland, General Otis B. Schreuder, M.D., Medical Director, Atlantic Division, Pan American World Airways, stated "The question then evolves, when should a pilot be retired or discontinue active flying. In my opinion, there is no definite set age. It depends upon certain factors, namely, of course, upon his ability to accomplish his job efficiently. It is the functional age rather than his chronological age which is of importance."[9]

11. March 29-31, 1954. The late Dr. Howard K. Edwards, speaking on *The Aged and Retiring Pilot,* told the 25th annual meeting of the Aero-Medical Association that, "Our big problem today is not so much the age in retiring pilots, because I feel our approach to their retirement is very realistic; but the approach to retirement for the executive-class individual in aviation is not very real. . . . We need to make much bigger studies in taking care of our executive group and get them on a maintenance basis, pick up minor defects early and take care of them."[10]

1955

12. Nearly four years ago, on October 29, 1955, the NEW YORK TIMES reported "Time-honored beliefs about the aged are becoming outmoded," and that "people stay younger longer than studies indicate." Their story explained further that Dr. Irving Lorte, Professor of Educational Psychology, Teachers College, Columbia University, told the 8th Annual Scientific Conference of the Gerontological Society, that Shakespeare's depiction of the Seven Stages of Man from Birth to Death was probably an accurate description for the 16th Century in which he lived, but that it no longer applies. The Society was also told that Bismarck's arbitrary age 65 milestone, marking the retirement age in the 19th Century was also out of date.

Other speakers at that meeting stressed the fact that much of the accepted data about the aging and aged had been gathered in institutions and hospitals. "As a result they reflect the conditions of a limited group in late stages of deterioration and illness. An entirely different picture would be obtained by studying the whole aged population of today, which includes many who are healthy, well-adjusted and employed. . . ." Dr. E. L. Bortz, Chairman of this session and former President of the American Medical Association, put it this way, "People not only live longer today, they stay younger longer."[11]

1956

13. Dr. Ross A MacFarland, writing in the *Bulletin of the New York Academy of Medicine,* warned, "In the first place, it is important to realize that there are great differences in the inherent abilities or capacities of individuals of any given age. When any psychological trait is measured in groups which differ in age, numerous members of the oldest group will perform more effectively than the average of the youngest group, and many in the youngest group will be below the average in the oldest group. Chronological age alone, therefore, is a very uncertain indication of functional ability. Hence a concept of functional rather than chronological age is required. . . . It is important to interpret the implications of aging in any sensory field in relation to vocational adjustments. Experience in this field requires a constant revision of our earlier and possibly erroneous concepts. Flying an airplane was originally believed to be an avocation or vocation of young men. . . . In 1954 there were more than 30 airmen 50 or over, holding medical certificates as air transport pilots, and about 50 approaching 60 years of age. It would have been unwise to ground such individuals for sensory defects, since their operating record has proved excellent. The important point is that age changes vary greatly from one person to another, both in nature and extent. An appraisal of a person's capabilities at any given period should include the amount of compensation present, based on previous experience. It is well known that compensation for declining functions can and usually does occur, so that the end results of behavior often show little change, and sometimes even improvement. It thus becomes of great importance to establish

7. McFarland, Human Factors In Air Transportation, 398-399.
8. Dennis, Wayne, PhD., Age and Behavior, A Survey of the Literature, Project Number 21-0202-0005, Report Number 1, USAF School of Aviation Medicine, Randolph Field, Texas, May, 1953, vi-vii.
9. Schreuder, Otis B., M.D., The Aging Pilot presented at the Meeting of the French Speaking Branch of the Aero-Medical Association, Zurich, Switzerland, September 22, 1954.
10. Edwards, The Aged and Retiring Pilot.
11. Asbury, Edith Evans, "Opinions on Aged Called Outdated," The New York Times, October 29, 1955.

when, in the normal process of aging, deterioration is no longer compensated by prosthetic aids, past experience, or a change in methods.

"Extensive studies of motor activity have revealed most sudden alteration in the speed of response from one age group to another. There is a gradual rise in quickness of response in childhood and youth, followed by a slow decline in maturity. However, individual differences at any age are great, and the average performance of a considerable number of older persons equals or exceeds that of individuals who are several decades younger. . . ."

"The more complex a function becomes psychologically, i.e., the more it depends on experience, judgment, and reasoning, the more resistent it is to deterioration with age. For instance, in a study of vocabulary it was shown that professional persons progressively increased in ability through the ages of 60-70 years. Subjects who were institutionalized, however, where a language was not a major factor in daily living, showed an opposite trend. Apparently, the brain, like other organs of the body, shows continuous improvement over the life span if appropriately 'exercised.'"

"The process of aging follows no clearly defined course of events by which it is possible to determine accurately the 'age' of any individual. . . . The findings indicate that aging is, to a great extent, an individual matter and that there are many facets to the aging process. . . ."

"In appraising the capabilities of older people, the important variable to consider is not chronological, but rather functional age, or the ability to perform required duties efficiently and safely. Chronological age alone is rarely a reliable index of a person's physical or mental development and adjustment. . . ."

"The natural process of aging is of more significance for some occupational groups than others by virtue of differences in the demands made upon individual ability. A defect in vision or hearing may be important for one occupation but not for another. . . . Corrective aids for defective vision and hearing can often overcome changes, and compensation through training or experience is often greater than the deterioration due to the aging of functions. Each individual should be evaluated, therefore, in relation to the demands of the job, and the amount of compensation he has developed."[12]

14. Another panel discussion on the "problem of pilot aging" was held at the 26th annual meeting of the Aero-Medical Association. Dr. Thomas A. Coates, then as now a member of their Executive Committee, told that group: "It is my feeling that in dealing with the aging pilot the important thing to consider is not his chronological age, but his functional age. The important factor to consider is, can the aging pilot perform his regular duties with efficiency and safety? Chronological age is certainly no gauge by which a pilot's efficiency and safety pattern can be measured. I know of no group of physical, clinical, or laboratory tests which will determine the chronological or the functional age of a pilot, nor can they determine how proficient or safe he might be. Among pilots, just as among the general populace, there is a great differential in the functional decline of individuals, as they grow older. This process of functional decline is one of individual adaptation and should be dealt with on an individual basis. The older pilot is a very valuable asset to his company. The older pilot has been exposed to the elements for a long time. He knows his airplane thoroughly. He has flown repeatedly under almost every conceivable condition. He knows almost instinctively whether to turn back, or to continue on course. An older pilot, who is mentally and physically alert, who is well versed in the operation of his aircraft, is certainly much more safe than the younger and more inexperienced pilot, who might have had difficulty in checking out, and whose judgment and action in an emergency might be questionable."

"As pilots grow older they can compensate for the physical changes that come with age. Some functional capacities may decline, while others may improve. The aging pilot has had years of flying experience and for this wealth of experience there is no substitute. Over the years, the aging pilot has matured in accuracy, skill, judgment, endurance and precision."

"In discussions like this we have referred to them as 'the problem of the aging pilot.' To my way of thinking, the aging pilot, who has withstood the ravages of disease, who over the years has maintained his functional capabilities, is no problem. He is a very valuable piece of human equipment. Far from being a problem, he is almost a blessing."[13]

15. Near the close of a two-day Aviation Medicine Symposium on the aging pilot, which was held March 15 and 16, 1956 at Wright-Patterson Air Force Base as a part of the United States Air Force Aviation Medicine Residency program, Brigadier General M. S. White, then First Vice President of the Aero Medical Association, discussed the question, "Can the Aging Pilot Compensate for His Medical Shortcoming?" He stated in part, "Dr. Yerg has outlined very well the real medical implications, and now we have to answer the question, 'Can the Aging Pilot Compensate for His Shortcomings?' I can condense the whole talk down to one word, and stop. You know what that word is, 'yes.'" Dr. White then explained and discussed his reasons for such a categorical answer and concluded by saying, "In closing, remember that aging is asymmetric. As certain somatic and psychic attributes decline with aging others become stronger. Memory may decline but judgment in the appraisal of the significance of facts improve with age. The ability to comprehend that which is seen improves with experience. Experience is dependent on time and therefore inevitably grows with age. Our objectives should not be merely to prolong life and relieve suffering but to add health and usefulness to the individual's life."[14]

1957

16. In the hearings concerning S.1045, a bill to create a Federal Department of Civil Aviation Medicine, Brigadier General Victor A. Byrnes (MC), USAF Director of Professional Services, Office of Surgeon General USAF, was questioned by Senator Monroney on whether the Air Force needed men with faster reflexes, etc. to fly their latest aircraft. General Brynes replied, in part, . . . "Experience you see does a great deal for the individual. What we have tried to determine is the point at which experience no longer compensates for the decreased capability of the individual. And this has not been determined to date. We are still working on it. We are and the Navy is. And we have not been able to come up with any single physical measurement nor determination of age which will allow us to state: at this age this man comes off; at this age he is all right. . . ."[15]

17. Captain E. E. Rodley, currently operating Comet IV for BOAC was involved in the original training program when BOAC pioneered Comet I. In November, 1957, he told the Flight Safety Foundation's Ninth Annual International Safety Seminar: "There had been a lot of talk previously about age limits, stemming, subconciously no

12. McFarland, Ross A., Ph.D., "The Psychological Aspects of Aging," Bulletin of the New York Academy of Medicine, January, 1946, 14-32.

13. Coates, Thomas A., M.D., "The Aging Air Line Pilot," The Air Line Pilot, June, 1946, 2, 14-15, based on address by the author to Aero Medical Association Annual Meeting, Chicago, April 16, 1956.

14. Aviation Medicine Symposium, The Aging Pilot, USAF Aviation Medicine Residency Program, Headquarters Air Material Command, Wright Patterson AFB, Ohio.

15. Hearings before a Subcommittee of the Committee on Interstate and Foreign Commerce, United States Senate, Eighty-Fifth Congress, First Session on S. 1046, April 1, 2, and 3, 1957, p. 36.

doubt, from mental pictures of military pilots adorned in 'G' suits and bone-domes. Our view was that there were no physical barriers other than the normal medical standards, but what 'was' important, was that the pilot should have resisted the tendency, which comes with increasing age and experience, to believe that he had nothing to learn. He should be intellectually alive to modern thought in aviation. He should also be mentally alert and able to cope with—and remain ahead of—the vastly increased tempo of a new method of operation. This is most important. It will be seen then, that we were not asking for super-men—in fact the good average pilot seemed eminently capable of fulfilling our demands."[16]

1958

18. On March 31, 1958, the Flight Safety Foundation submitted the final report in fulfillment of their $100,000 contract to conduct an independent survey of civil aviation medicine as it is applied and administered in this country. Their 27-man Medical Advisory Panel exhaustively reviewed the adequacy of present standards and made several recommendations for revision. It is of particular interest to note that there is no mention of a chronological age cut-off in their report and that they flatly stated, "No medical justification could be found for changing medical qualifications for airmen as the result of jet or turbo-prop transport operation."[17]

19. Jerome Lederer, Managing Director of the Flight Safety Foundation and an international authority on air safety, wrote the aviation insurance underwriters: "Because the jet transport is a high performance airplane flying twice as fast and twice as high as current aircraft, many believe that they will require young supermen to fly them. Discussions with airline pilots and executives who have operated jets in scheduled service discount this belief insofar as physical requirements are concerned. The most frequent question concerns age. Age may create strong resistance to departing from long established habit patterns and concepts of operation. But there are no valid criteria that prove a man should stop flying at a given age. Some pilots are 'young' at 60, others are 'old' at 45. Pilots who have become 'set' in their ways, who rebuff new standardization procedures, will have great difficulty serving a thorough jet training course, regardless of age."[18]

1959

20. The February issue of the Journal of Aviation Medicine contained a paper presented by Dr. Kenneth G. Bergin, Chief Medical Officer of British Overseas Airways Corporation at the Third European Congress of Aviation Medicine. Dr. Bergin's paper was entitled *Medical Aspects of Civil Jet Air Transport Operations* and covered the civil operation of Comet jet aircraft over a period of eight years. While discussing "Characteristics of Pilots", Dr. Bergin stated: "A previously held conception that pilots for jet aircraft should be of the fighter pilot mentality has been proved to be misguided and, by the same token, *any arbitrary age limit of those competent to fly is not supported by experience.* In this connection it is important to remember that while reaction time may be slower in an older person, in the final analysis of reaction to conditions due weight must be given to the value of experience in any set of circumstances—the older and more experienced pilot carrying out his task with an economy of thought and action which is not available to his less experienced colleague. In this context, it is important to remember that conversion to any new aircraft is not easy for certain persons by reason of the complexity of techniques and learning required, to which jet aircraft are no exception; similar restrictions apply, however, to conversion to any different type of aircraft. It is important to stress here that the problems inherent in civil flying are fundamentally different in many ways from those met with in military operations. Experience has shown that failures in training are not confined to the higher age group."[19]

21. In a speech given at an International Air Transport Association Symposium on Pilot Training, Boeing's Chief of Flight Tests, A. M. "Tex" Johnston stated, . . . "I, personally, do not think that any age limit should be put on the selection of jet pilots."[20]

22. The July 12, 1959 issue of *This Week* Magazine contained an article by Louis Orr, M.D., newly elected president of the American Medical Association. Dr. Orr's article discussed the problem of compulsory retirement and he stated: "At the outset, I want to make it clear that I am not opposed to retirement for anyone who wants to retire. I am opposed, however, to any arbitrary system which forces retirement at a given age.

"There is no scientific rhyme or reason for selecting '65' as the magic number separating the productive from the nonproductive, the healthy from the unhealthy. Physicians have no convenient rule of thumb definition for old age. We see certain degenerative signs as men progress in years, but we also see many men 65 and over in better mental and physical health than persons 10 to 20 years younger."[21]

23. A recent editorial in the magazine *Flight* entitled "Realistic Physical Standards" commented:

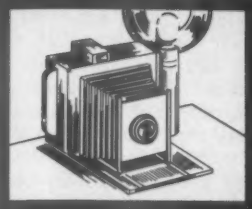
"Considerable attention is being given to age and health requirements for various categories of pilots by the Federal Aviation Agency and numerous proposals are being made that suggest our present civil air regulations are too loose in this regard.

"Rigid physical standards are necessary in airline, in military operations, and in special commercial piloting jobs. All evidence points to the fact that these standards are high and have been for many years. While an older man's reflexes may not be as positive or as quick as a younger man's, we go along with the belief that each case should stand on its own merit and an empirical age limit on air transport flying has few advantages to offer aviation safety. Some fifty-five-year-old pilots are in better health than some thirty-year-olds.

"The Flying Physicians Association has gone on record with the Federal Aviation Agency protesting any changes in present medical requirements for pilots but suggested that the medical examination should be given by doctors who understand flying and something of what it takes to become a pilot. It certainly makes sense that the knowledge of the medicos making the examination is more important than all the bureaucratic rules one could possibly establish.

"Dr. Charles M. Starr, president-elect of FPA, states that 'medicine is not an exact science such as mathematics or physics. We can not use a slide rule or an equation to tell how each individual will perform. In medicine each person must be treated as an individual case. Doctors qualified to speak on what is required of civilian pilots should be heard. For too long we've had people who know little about flying doing the enactment of regulations about the physical requirements. I believe it is time to consult the doctors who are pilots or flight surgeons before making any changes in the civil air regulations.' "[22]

16. Rodley, E. E., Captain. "The Selection and Training of Pilots for Jet Transport Airplanes," Flight Safety Foundation Ninth Annual International Safety Seminar—November, 1957.
17. FSF/CAA Medical Study, Report Number 2, **Medical Aspects of Civil Aviation,** Flight Safety Foundation, Inc., New York, March 31, 1958.
18. Lederer, Jerome, **The Jet Powered Transports,** An Insurance Advocate Publication, The Roberts Publishing Corp., New York, 1958.
19. Bergin, Kenneth G., M.D., "Medical Aspects of Civil Jet Air Transport Operations," **Journal of Aviation Medicine,** February, 1959.
20. Johnston, A. M. "Tex", Speech before IATA Symposium on Pilot Training, June, 1959.
21. Orr, Louis, M.D., "Why Should You Retire at 65?", **This Week Magazine,** July 12, 1959.
22. Editorial, "Realistic Physical Standards," **Flight,** August, 1959.

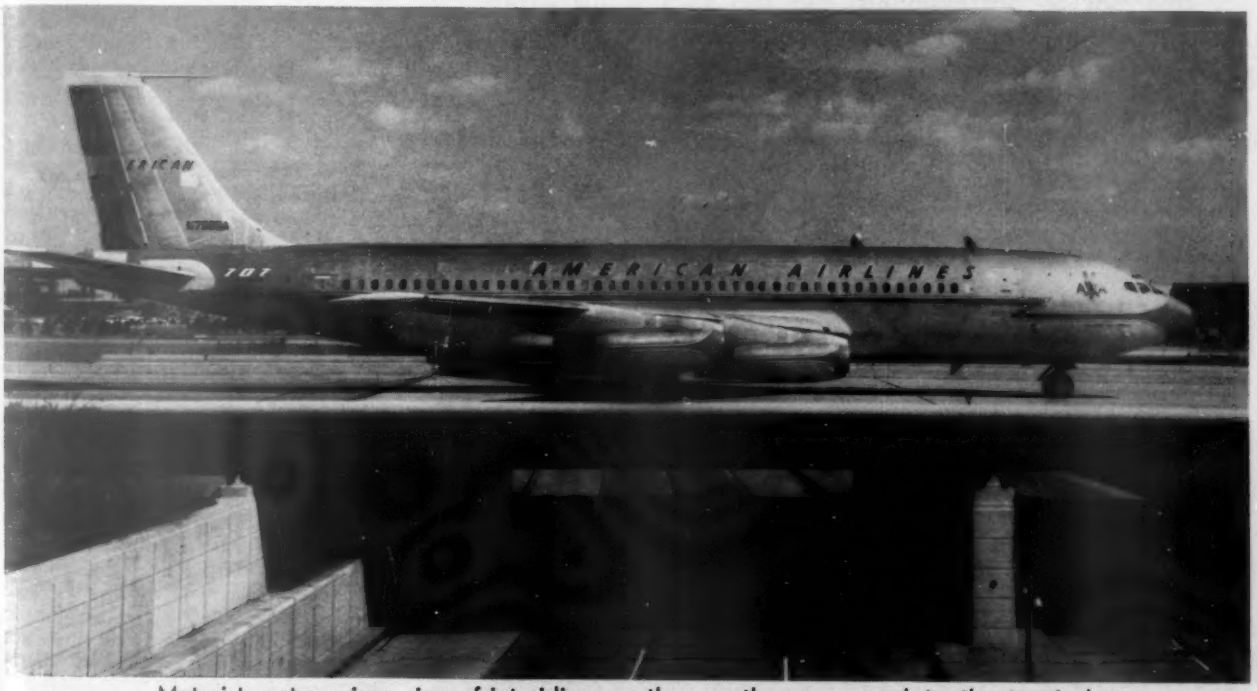


The ALPA Camera

Some Highlights and Sidelights of the News and ALPA in Pictures

West Pakistan Labor Relations Training team in conference; (l.-r.) Abu Saeed Enver, Glyn Johns, ALPA representative, and Jamal Hasan Shirazi.

Flight information from a closed TV circuit is utilized by Pan Am at the Miami International Airport.



Motorists get a unique view of jet airliners as they use the access road to the terminal area at New York International Airport.

Unionism And Air Safety:

How Pilot Unity Has Aided In Improving Air Safety

By Karl M. Ruppenthal

Some people, among them a few air line pilots, frown on unionism of professionals, but the fact is air safety is sometimes preserved only by trade union strength.

(This article first appeared in THE NATION. *The author, Karl M. Ruppenthal of local Council 69 has been an air line pilot since 1942. He lectures in Transportation and Management at the Graduate School of Business at Stanford.)*

NOT many years ago, the pilots on one of the nation's major air lines were complaining persistently about the condition of their aircraft, contending that maintenance was shoddy and inspection procedures lax. One morning a captain, about to board his aircraft, decided to make a close inspection. When he thumped the fabric on the elevators to see if it was taut, his thumb poked through. He refused to fly the aircraft because it was unsafe. The company fired him for damaging the plane.

The captain filed a grievance. The company refused him a hearing, and pressures increased. The matter was not settled until after a bitter strike. The pilots on that line retained the prerogative of refusing to fly any aircraft which they believe to be unsafe.

Since the earliest days of air line flying, there have been conflicts between pilots and their employers regarding air safety. The first transport planes had but one radio; if a wire shorted or a tube got tired, it went dead. On clear days, this mattered little, for the flight simply proceeded to an airport unannounced. But if the pilot was on instruments, he was immediately in trouble. When the Air Line Pilots Association demanded that two radios be made standard equipment on all transports, many air lines resisted, objecting not only to the cost of the extra radio but to the payload that would be displaced. The ALPA won. Today's planes carry dozens of specialized radios which make possible modern navigation.

By law, the air line captain is charged with the safe operation of every flight. Once off the ground he has virtually the same authority as does a sea captain. The Civil Air Regulations clothe him with emergency authority which would allow him to jettison cargo, land at a SAC air base, or subdue a drunken passenger. About the only requisite is that an emergency must actually exist. After he lands, he must file a written report.

But on the ground the story may be different. The advance plans for a flight may be based on a forecast of good terminal weather. Every seat on a popular flight from New York to Los Angeles may be sold. Such a flight may require 5,800 gallons of gasoline for non-stop operation. But what happens when the captain arrives at the airport and discovers that the forecast did not pan out and that terminal weather is borderline? A conservative flight plan, calling for sufficient fuel to hold at Los Angeles for an hour or so and then proceed to an alternate airport, may require 6,300 gallons of gas. But if he requests this additional weight in fuel, confirmed passengers may be removed. If they are, the company may be charged with violating the CAB's oversale regulations. If he accepts the lower fuel release, he may have to land at an enroute airport for fuel. And this course of action is something less than popular on a flight which is billed as non-stop! The solution? Some air lines are conservative. They confirm reservations for only those passengers who may be carried with the heavier gas load. But others toss the ball to the clerks at the airport.

Mis-Addition

Squeezed by the pilot's demand for adequate fuel and the passengers' insistence on riding the plane on which they are confirmed, the agent may resort to faulty addition. The pilot will get his fuel (he will not take off without it), and the passengers will all be loaded. But their weights will be misadded. This means, simply, that the flight may take off with a couple of thousands pounds overweight, and the plane may groan a little as it approaches the end of the runway. Such an overweight condition is not critical on the DC-7s and Constellations at most airports today, but on the jets the story may be different. At many airports short runways already limit take-off gross weights of the jets. There isn't much margin for mis-addition.

Sometimes the air lines do not provide their planes with all the available safety devices. Not long ago, one of the major air lines bought a fleet of planes without steerable nose wheels or reversable propellers. Steerable nose wheels make it possible for a pilot a maneuver

a plane in a tight spot on the ground; reversible propellers help to stop a plane after landing. Both may come in handy on an icy runway.

When the ALPA demanded these devices, the company refused. A ridiculous request, said the company's executive vice president—an unjustifiable expense. But within months he had to eat crow. One of the planes landed on an icy runway at a busy terminal. Its brakes were ineffective, and it skidded out of control. It came to rest on a busy city street. Fortunately, traffic was light, and nobody was injured. The price of that accident would have outfitted the entire fleet with the safety devices. But it took a second accident at another airport to make the vice president change his mind.

Strange Bedfellows

Sometimes safety makes strange bedfellows. The ALPA safety committee on one air line was aghast at maintenance conditions. They protested to the chief pilot. Carefully they detailed their grievance: turn-around time was too short for proper maintenance; some stations didn't have enough mechanics; some faulty items were being written off without actual correction of the defects. Angrily, the chief pilot told them that they had no grounds for their complaints. He said that the company was as much interested in safety as they, and that all these matters had been carefully worked out. As the pilots prepared to leave he asked their chairman to remain. When the rest had gone and he felt he could speak in confidence, he changed his tune.

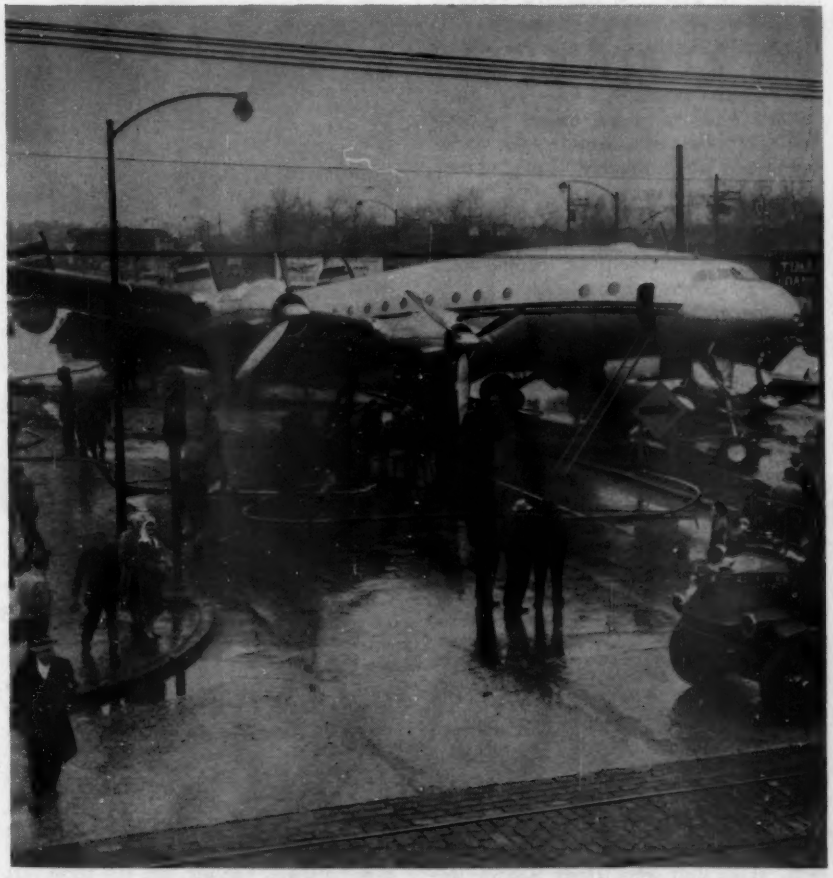
"For God's sake don't give up now," he said. "You're absolutely right. I've been trying to get more money for maintenance for months but old money-bags won't listen. I need your help. If you raise enough hell, we'll get the money. It might take a strike threat to jar them loose. You guys have the power."

Another chief pilot was not so subtle. His line had launched a campaign to sell itself as the fastest air line in America. For months it advertised schedules that the planes could not possibly make. When the passengers began to discover that the planes were always late, the company put the heat on the pilots to make better time. Subtly they were encouraged to cut corners. They seldom filed flight plans. Frequently they flew off airways. And they pushed their engines for all they were worth. When their engines began to fail at an alarming rate, they "forgot" to file engine failure reports with the CAB. Finally the situation got so bad that one chief pilot could stand it no longer. He made photostatic copies of the company's engine-failure reports and sent them to the ALPA. The Association acted. In a matter of days the CAB issued an order asking the line to show cause why it should not stop its illegal practices.

Copilot Training

The battle over safety seldom makes the headlines. Not long ago, the pilots on one line were concerned about the training given their copilots. Men were being assigned to four-engine aircraft with little more than "three bounces" to qualify them. Some had never even landed the aircraft. When the ALPA demanded that the copilots be given more training, the company insisted that it could not afford the expense. Since the basic contract was about to expire, the pilots proposed a section which would require a program of "adequate training, satisfactory to the Air Line Pilots Association." This the company could not allow. If such a section appeared in the contract, it would be tacit admission that the company's training had not been adequate. If it refused, however, and the matter went to arbitration, the slipshod training practices might make the press. So the company agreed—to the training, that is, not to the contract provision. While nothing about it appears in the printed agreement today, the copilots are getting the training they need.

All this is not to say that the air line companies are not interested in safety. They are. But the point of view is not always the same. Some pilots believe that the board of directors sits in its walnut-paneled room and coldly calculates the cost of safety equipment as against the probable cost of an accident. Probably nothing so cold-blooded ever happens. But the pilots on the nation's air lines are a lot closer to the scene than the non-flying executives. It is the business of the company's management to avoid extravagance and to make a profit. The pilots hope management succeeds. For themselves, safety considerations come first.



Reversible Props Could Have Prevented This

TWA Captain Spearheads Sailplane Flying

By James R. Ashlock
of Kansas City Star

CAPT. Robert W. Bower, commanding a Trans World Airlines Jetstream, regularly strives to reduce flight time on the New York to Paris run. But on days off, he seeks to remain aloft as long as possible in a vastly different type aircraft.

Summer weekends, when the blistering Kansas prairie is polka-dotted with shadows from big cumulus clouds, Capt. Brower, Local Council No. 24, is out chasing thermals in a trim sailplane. Capt. Brower lives at Kansas City, commuting to New York for his overseas flights.

The 45-year-old Captain says he isn't discontented with powered aircraft, in which he's logged over 17,000 hours. But he likes the sport and challenge of soaring, to which he was first exposed in junior high school. That was at Harren junior high, a manual school in New York that included aviation among its courses.

"We built a glider there, but the board of education wouldn't let us fly it," laughs Capt. Brower. "I'm glad now they didn't, because we were pretty young."

The year 1932 found Capt. Brower at his native Philadelphia, logging time in an old Waco Primary glider. It was little more than a fabric wing and tail assembly on a fuselage of exposed tubing.

"In my soaring log book I've got early entries such as "excellent flight; duration, 9 seconds," Capt. Brower said. "That was pretty good in those days." Since then, Capt. Brower has made a 3 hour, 17 minute flight at Elmira, N.Y., in a modern sailplane.

It wasn't until 1940 that Capt. Brower received powered flight instruction under the Civilian Pilot Training program. In 1942 he joined TWA, which was under contract to the Air Transport Command. In 1945 he attained his present air line rank.

Spearheaded Soaring Association

In September, 1957, Capt. Brower made a move that gave soaring a firm boost in the midwest. He spearheaded formation of the Midwestern Soaring Association, which now has 30 members. With him were Peter Riedel, internationally known soaring expert who is a liaison engineer between TWA and the Boeing Airplane Company. Also there was Alan Schmid, Westinghouse turbine engineer, now working on rockets at California.

TWA Captain Robert Bower shows a student the fine points of keeping a sailplane airborne

Through the soaring association, student sailplane pilots are benefitting from Capt. Brower's extensive aeronautical experience. They're learning how to study the air, get the most out of a plane and stay up by skill.

"As a hobby, this can't be beat," claims Capt. Brower. "But it can create complications with the wife."

Mrs. Pat Brower demands some concession for her husband's being gone, either to Paris or to Kansas, so much. But Capt. Brower thinks she's satisfied for this summer at least, although he had to dig deep to pay for the sailboat he's put on a nearby lake for her and their two boys.

TV Highlights Piloting Career

Capt. David Nelson, Local Council No. 20, appeared recently on the program "Careers" on Milwaukee station WMVS-TV.

For 15 minutes Capt. Nelson, (above left) with the aid of film clips, seen in rear projection behind him, discussed the opportunities in his career field with special emphasis on pilot education requirements.

Capt. Nelson's appearance is typical of the public relations job done by ALPA members on the local level. Members are able to keep local media informed of their careers and news of local councils providing a better public image of the Association.

Many pilots speak before local service organizations and counsel high school and college students on careers.

King Made Crew Member

The youthful monarch of the Kingdom of Jordan seems to show no sign of worry about the political turmoils plaguing his rule as he is seen with Capt. John S. Rowe of Local Council No. 36. The picture was taken on an around-the-world trip on which Hussein was made an honorary member of the crew by Capt. Rowe.

The chartered Pan American Clipper flew from Jordan to Formosa, then across the Pacific to San Francisco, and later to New York and London.

Beyond Call Of Duty

Rescue Disabled Cruiser

Two Western pilots are credited with action leading to the night rescue of two men adrift in a disabled cabin cruiser.

Captain Claude Gray and First Officer Robert Schmidt, both members of Local Council No. 16, were en route from Los Angeles to San Diego, California when they spotted the flash of an "SOS" from the vessel about 15 miles west of Oceanside, California.

They circled the cruiser and radioed for aid. An air-sea rescue amphibian and a Coast Guard cutter immediately located the cruiser and safely towed it to shore.

Find Lost Private Plane

The alert action of Capt. Willis E. Schubert, in aiding a lost private plane, was noted recently in a letter from the Air Route Traffic Control Center of the Federal Aviation Agency.

Willis, Local Council 89, vectored his flight to the area of Janesville, Wisc., established identification of the lost craft and led it to a safe landing. Schubert had been advised of the emergency after the ARTC determined the location of the lost craft.

In writing Schubert's employer, North Central Airlines, Raymond G. Belanger, Chief, ARTC stated: "Cooperation and assistance extended by this pilot is to be commended in that he could very well have averted a tragedy."

Miss Missouri Shown Electra

A contender in next month's Miss America Contest gets a first hand introduction to the Lockheed Electra from American Airlines Capt. Jeff Stetson, Local Council No. 39, a man who knows the turbo-jet well. Miss Linda Mae Long, the 1959 Miss Missouri, inspected the plane with Capt. Stetson as her first official duty after she was chosen to represent her state in the contest.

King Hussein With Capt. Rowe Smiles After Being Made An Honorary Crew Member

Special Report:

International Performance Regulations

Prepared By The International Federation
Of Air Line Pilots Associations

At the Third Meeting of the International Civil Aviation Organization Airworthiness Committee in July, considerable time and endeavor was devoted to reach an agreement on the text of a Provisional Acceptable Means of Compliance for Airplane-Performance.[1] This traces the recent development of international airworthiness requirements which has resulted in the substantial agreement on a single performance code; briefly describes the empirical and rational methods used in determining airworthiness regulations and, finally, the proposed Provisional Acceptable Means of Compliance is compared with the existing Acceptable Means of Compliance in Annex 8.[2]

Historical Background

The primary objective of performance regulations is to ensure that aircraft which are operated in accordance with the performance data appearing in the Flight Manual, and with the corresponding performance operating limitations, will realize a satisfactory level of safety. In the past a high level has been achieved by basing the regulations on the average characteristics of a number of aircraft having a good record of safety in service.

The first International Airworthiness Standards for commercial aircraft based on this method were established in the 1920's by the International Commission for Air Navigation (ICAN). They constituted the minimum requirements which were considered at the time appropriate to govern the recognition, by a Member Nation, of the certificate of airworthiness issued by another Member Nation.

In 1944, the Chicago Conference adopted the policy of having a complete, comprehensive and detailed code to govern the recognition, as between Contracting Nations, of the certificates of airworthiness. Draft Annex G, which was initially similar to the empirical code employed by the United States for the type certification and operation of aircraft, was accepted as a model of the desirable scope and arrangement of the ICAO Airworthiness Annex.

As a result of the First and Second Sessions of the ICAO Airworthiness Division, held respectively in March 1946, and February 1947, Draft Annex G was revised and Standards and Recommended Practices[3] established. The Division recommended a progressive implementation such that all passenger aircraft used on scheduled international services should comply with ICAO Standards from 1st January, 1954.

The Division had, however, indicated that several questions of fundamental importance, such as temperature accountability and the numerical values of the rates of climb, were still not satisfactorily resolved. With the advent of modern aircraft employing high wing loadings, it had become apparent that the type of code which specified the rate of climb in terms of the square of the stalling speed, might hamper the development of new trends of design. Moreover it was realized that the level of safety achieved by such a code for each individual flight was not necessarily the same as that for all flights taken together.

Thus in March, 1949, when incorporating in Annex 8 the recommendations of the Division, the Council of ICAO re-graded to "Recommended Practices" the numerical values for the rates of climb and a provisional policy decision was taken to the effect that certification of an aircraft in compliance with the technical

[1] An **Acceptable Means of Compliance (AMC)** for Airplane Performance is an example illustrating an acceptable level of airworthiness based on an existing performance code. While it is not mandatory for a Contracting State to work to a performance AMC, it is mandatory to work to a code which achieves equivalent safety. Since an AMC illustrates a code which has been found acceptable in the past, it is, of necessity, somewhat out of date and a **Provisional Acceptable Means of Compliance (PAMC)** has been introduced, therefore, to show the more up-to-date thinking. While having no official status, the importance of the PAMC should not be underestimated since it will probably be used as a basis for certification and operation of imported aircraft by smaller States not having their own safety rules and thus will become the detailed international code.

[2] **Annex 8** deals with the airworthiness of aircraft and **Annex 6** with the operation of aircraft. Each Annex is complementary to the other but the general difference between them can be seen by the fact that AMC No. 2 in Annex 8 specifies the climb gradients for certification while in Annex 6 AMC No. 2 specifies the terrain clearances for a particular operation.

[3] **Standard:** Any specification for physical characteristics, configuration, material, performance, personnel or procedure, the uniform application of which is recognized **as necessary** for the safety or regularity of international air navigation and to which Contracting Nations will conform in accordance with the Convention; in the event of impossibility of compliance, notification to the Council is compulsory under Article 28.

Recommended Practice: Any specification for physical characteristics, configuration, material, performance, personnel or procedure, the uniform application of which is recognized **as desirable** in the interest of safety, regularity or efficiency of international air navigation, and to which Contracting Nations endeavor to conform in accordance with the Convention.

Report Cites ICAO Airworthiness Committee's Endeavors To Reach Agreement On The Text Of A Provisional Acceptable Means Of Compliance For Airplane Performance

Standards was not compulsory. This policy enabled the significance of the new requirements to be assessed and gave advance indication to the manufacturers and operators as to the specifications which the Council believed would ultimately become mandatory.

In 1948 a paper entitled "The Derivation of Airworthiness Performance Climb Standards" was produced in the United Kingdom by F. G. R. Cook, B.Sc., and A. K. Weaver, M.A. This paper proposed a method whereby the structure of a performance code could be determined by a statistical treatment of the practical contingencies affecting an aircraft's climb performance. This formed the basis of the proposals of the United Kingdom for the development of new Standards, and at the third session of the ICAO Airworthiness Division in February, 1949, it was agreed that requirements should be developed by means of statistical analysis. This method subsequently became known as the "rational" method.

At a special meeting of the AIR/OPS Committee in 1950, the principles outlined in the paper mentioned above were accepted unanimously and the following year, at its fourth session, the the Airworthiness Division, working with the Operations Division, produced tentative Standards and Recommended Practices for use in trial applications. The resulting performance code was given the status of an alternative to the existing empirical code and was introduced by the Council in December, 1952, as attachments to Annexes 6 and 8. At the same time the Council urged that, in order to gain the operational experience needed to establish sound principles for future Standards, Contracting States adopt national regulations derived from the specifications in the code newly attached to the Annexes.

As a result of a proposal by Canada at the fourth session of the AIR/OPS Division, a small Standing Committee on Performance (known as the SCP) was established to continue the development of the tentative Standards. After four meetings, over a period of two years, the Committee presented an amended performance code and recommended that Contracting States be invited to proceed with trial applications. However, it became apparent that the Standards and Practices tentatively recommended needed further development.

In a report to the Council in 1954, the Air Navigation Commission stated its belief that the efforts to develop a set of complete, comprehensive and detailed specifications similar to the rules and regulations employed by the national authorities for the type certification and operation of aircraft were impracticable of attainment. Moreover, the Commission believed that a set of complete specifications, once established, could not be kept up-to-date through the machinery of ICAO without excessive expense and administrative effort. The commission therefore proposed a new policy in which the primary objective of international airworthiness Standards should be to "define the minimum international basis for the recognition by States of certificates of airworthiness for the purpose of the flights of aircraft of other States into and over their territories".

This would achieve, among other purposes, protection of other aircraft, third persons and property. It would not be the objective of ICAO Standards of Airworthiness to replace national regulations and each State would thus be under the obligation to establish its own comprehensive and detailed code of airworthiness, or to adopt a code established by another Contracting State. The level of airworthiness to be defined by this code would be indicated by the ICAO Technical Standards, supplemented if necessary, by Acceptable Means of Compliance previously defined.

In order to prepare an initial draft for revision of Annex 8 and of the complementary part of Annex 6, consistent with the new policy, the Air Navigation Commission established a body of experts designated as the "Airworthiness Panel". This then superseded the old SCP. The Panel, in its final recommendations, was influenced mainly by the very substantial body of past operating experience represented by the United States code and thus recommended that the Acceptable Means of Compliance for Performance should be based on empirical methods. The main differences between the existing Annexes and the AMC were that several specifications of rates of climb were amended, temperature accountability was more fully applied operationally to the accelerate-stop distance and the take-off distance, and a reference humidity[3] was introduced for specifications of performance.

The Panel also recommended that action should be taken to prepare a rational code, as suggested by the Standing Committee on Performance, in a form suitable for its adoption as an Acceptable Means of Compliance. Finally, in 1956, at the Third Air Navigation Conference an AMC based on the rational method was proposed and eventually incorporated as AMC No. 2 in Anexes 8 and 6, the orginal empirical AMC becoming AMC No. 1.

It had been recognized for some time that the ultimate goal to be achieved was the gradual merger of the two Acceptable Means of Compliance into one. However, AMC No. 1 was based on the United States' performance code and AMC No. 2 on the United Kingdom's code. The difficulty of reconciling these two different approaches to performance in order to obtain a single code will be readily appreciated. This task was undertaken by the Airworthiness Committee, a new body, which was formed by the Commission after the Third Air Navigation Conference in 1956 and which took over, as one of its tasks, the previous work on performance which had been carried out by the SCP and the Airworthiness Panel.

At the first meeting the Committee recognized that there was in fact a good possibility of developing a set of specifications which all its members would consider as worthy of trial and at the second meeting, in July 1958, a draft PAMC was produced. Agreement was not reached on all points and it was therefore decided to study the draft further with the intent of finalizing the PAMC at the third meeting which is scheduled for July, 1959.

This, then, is the position at the present date.

Comparison Between the Empirical and Rational Methods

Both the empirical and the rational methods, used in developing performance requirements, are analytical but in the case of the rational method the analysis is more elaborate.

In the empirical method the first step consists in splitting the flight, as logically as possible, into several stages, each of them being characterized by a configuration or by a modification in the configuration of the aircraft. Then, by examining separately each flight stage, factors likely to have a marked influence on the performance of the aircraft are singled out. A certain number of these factors, among them the airport altitude and headwind component, are known in advance with a varying degree of precision. These factors, which are called operational parameters, are taken into account separately for each flight.

A study of the statistical data available shows quickly that, of the other factors, the values of which are impossible to forsee for a given flight, the most important is the failure of one engine. Failure of one engine, however, is not the only eventuality to provide for in a given flight and thus the performance required with one engine inoperative must be higher than the performance strictly necessary to ensure the safety of the flight.

The rational method follows the same broad lines: (1) splitting up the flight into a number of stages (which are practically the same as in the empirical method). (2) particular study of each stage in order to determine those factors likely to have a marked influence on the performance of the aircraft; (3) distinction between operational parameters on the one hand and, on the other hand, the factors affecting performance which it is impossible to take explicitly into account for each particular flight[4], (4) derivation of the performance to be required for each stage.

Differences between the two methods seem now to remain only in the choice of operational parameters and in the method of computation of the performance.

The principles of the empirical and rational methods can thus be summed up as follows:

The Empirical Method: After a detailed analysis of the flight, considering each flight stage or sub-stage separately, taking into account the fact that the weight of the aircraft will be calculated in accordance with a certain number of operational parameters, knowing that the aircraft performance will vary somewhat around the computed value and having learned by experience the approximate value of the strictly necessary performance, *one can roughly estimate the minimum performance required.*

The Rational Method: The only difference in the principle of this method is that the variations in performance around the computed value are studied and hence *the minimum performance can be deduced.*

Having stated the principle involved, the basic approach used in deriving performance requirements by the rational method is now explained in the following paragraphs.

In any code of airworthiness requirements there is an implied level of safety since, as in any human activity, an absolute level of safety cannot be achieved. Past requirements were based upon operational factors which were known, at that time, to affect the

[3]The existing Standards were based on the code in use by the United States.

[3]The Reference Humidity is a humidity to which the mandatory performance information is related. In the AMC a water vapor pressure was assumed which corresponded to 80 per cent relative humidity in standard conditions.

[4]These factors are known as statistical variables, typical examples of which are variations in engine power, profile drag, piloting technique, etc.

STALLING SPEED

New PAMC	AMC No. 1	AMC No. 2
V_s is defined as the Minimum Speed in a Stall or the Minimum Steady Flight Speed.	V_{s1} is defined as the greater of: a) the speed at which an angle of attack greater than that of maximum lift is reached, or b) the speed at which a large amplitude pitching or rolling motion, not immediately controllable, is encountered.	As for AMC No. 1.

Illustration 1

TAKE-OFF SAFETY SPEED

New PAMC	AMC No. 1	AMC No. 2
The minimum take-off safety speed, V_2 min. (calibrated airspeed) should be the greater of a) or b), a) As applicable, a speed equal to -1.2V_s for two-engine propeller-driven airplanes, and for airplanes without propellers on which the application of power does not result in a significant reduction in the one-engine inoperative power-on stalling speed; —1.15V_s for propeller-driven airplanes having four engines, and for airplanes without propellers on which the application of power results in a significant reduction in the one-engine inoperative power-on stalling speed; b) A speed equal to 1.10 V_{MC} (Minimum Control Speed). The take-off safety speed V_2 (CAS) should be not less than V_2 min. and not less than the rotation speed V_R plus the increment in speed attained in reaching 35 ft. with one engine inoperative.	The Take-off Safety Speed (CAS) must not be less than: a) 1.20 V_{s1}, for airplanes with two power-units; b) 1.15 V_{s1}, for airplanes having more than two power-units; c) 1.10 V_{MC}	As for AMC No. 1.

Illustration 2

TAKE-OFF SPEED

	Prop-driven Aircraft (4-engined)	Pure Jet Aircraft (4-engined)
AMCs V_{s1}	110 knots	110 knots
Take-off Safety Speed V_2	1.15 V_{s1}=127 kts.	1.15 V_{s1}=127 kts.
PAMC V_s	103 knots	103 knots (106 kts)*
Minimum take-off safety speed V_2 min.	1.15 V_s=119 kts.	1.20 V_s=124 kts. (127 kts)*
Power-on ground stalling speed	103 knots	110 knots
Margin of V_2 min. above power-on stalling speed	15%	13% (15%)*

Illustration 3

*..The figures in brackets are those obtained by applying the latest U.K. Regulations.

performance of an aircraft for example, temperature, power deterioration, inaccuracies in flying techniques, etc. A minimum performance was prescribed to insure that the cumulative adverse effects of these various operational factors could not lower the nominal performance to a level below that essential for safety. The necessary margin between the minimum and the nominal performance was chosen more or less intuitively on the basis of past experience.

The accumulation of experience over a number of years, however, enables consideration of most of the operational factors on a statistical basis. Once the variability of these factors has been established, it is then possible to choose a safe minimum or datum performance so that the probability of the average or gross performance falling below that datum does not exceed a stated probability. The stated probability is of course a measurement of the level of safety and the statistical evaluation of the operational factors ensures a more uniform level of safety between different flights and, at least theoretically, between different flight stages. This is the basis of the rational method.

When the performance falls below the datum, an incident is said to occur. An incident does not necessarily result in an accident since this will depend on the circumstances of the particular flight. For example, an incident is said to occur if the scheduled minimum safe flight level over a particular sector is 15,000 ft., but due to poor performance on the day in question, the aircraft can achieve only 14,000 ft. Whether or not there is an accident depends on the terrain and the accuracy of the navigation at the time. An incident, rather than an accident, is therefore, chosen for the definition of the datum because this can be defined in terms of performance.

The admissible frequency of occurrence of an incident is known as the design incident probabiltiy. It has been stated in the past that the actual incident rate achieved would be much lower than the design incident probability because a large portion of operations would be carried out at weights lower than the maximum permitted by the regulations. However, since it is now expected that the new jet aircraft will be operated to a considerable extent at, or very close to, their maximum weights, this additional safety margin will not be available.

When the datum has been chosen it is then necessary to add to this a performance margin to allow for the statistical variables. The sum of these two gives the average or mean performance which is regarded as that attainable by all aircraft of the type concerned. This is usually called the gross performance, while the net performance can be considered in most cases to be the same as the datum.

It should be emphasized that the datum performance is, in fact, only an estimation and that information required for the calculation of margins sometimes represents approximate values of the phenomena observed, as the statistical analysis of these phenomena cannot always be made on a sufficiently broad basis. The outcome of this is that it cannot be stated that the numerical value of the margin obtained by calculation corresponds exactly to the probability of registering a variation in the aircraft performance equal to the probability which served as the basis of these calculations, but that it corresponds to a probability of the same order.

Thus discussion of the respective values of two similar incident probability rates is relatively useless since each of them is, in fact, only an approximation. However, it is clearly necessary to maintain the same calculation hypotheses for the determination of all flight stages in order to arrive at homogeneous results.

It must also be appreciated that the implementation of an International Code of Performance has bearing not only on the safety of air transport but also on the earning capacity of this transport. For instance, a modification of 0.2% in the required climb gradient—that is of the same order as the errors made in computing the performance of the aircraft—brings about a modification of about 2% in the gross weight, which, in turn, may entail a difference of 10 to 20% in payload operating cost.

Thus, if one considers on the one hand the mathematical problems involved in assessing and combining the variables and, on the other hand, the commercial considerations involved, the difficulties in achieving one universally acceptable code are immediately apparent.

A Comparison Between AMC And Proposed PAMC

There are, of course, very considerable differences between the existing performance regulations and those in the proposed PAMC. The following comparison is not intended to be a complete one, therefore, but covers the more important differences.

In certain instances, for the sake of brevity, the full regulation or definition has not been quoted. The part, or parts, omitted have no bearing on the particular discussion involved and do not normally refer to the "general case."

Stalling Speed

Regulations in the United States have, for some time, allowed the use of the minimum speed in the stall as defined in the PAMC. In the United Kingdom, however, the practice, until just recently,

has been to use the stalling speed, V_{s1}, as defined in the AMCs. In certain cases the minimum speed in the stall may be as much as 7 knots lower than the actual stalling speed.

The latest U.K. Regulations now permit the use of the minimum speed in the stall, V_s, but a provisional clause is included to limit this to 0.96 times the stalling speed on airplanes for which the application of power gives no appreciable reduction in stalling speed. The following example shows the different values which can result from these definitions.

Consider an aircraft having a free air stalling speed $V_{s1}=110$ knots with a minimum speed in the stall 7 knots lower and on which the application of power gives no appreciable reduction in the stalling speed.

Then, V_{s1} (AMCs and old U.K. Regs.) $=110$ knots
V_s (PAMC and U.S. Regs.) $=103$ knots
V_s (New U.K. Regs.) $=0.96 \times 110=106$ knots

The possible effects which these different values may have on the take-off safety speed and the rotation speed will be seen in the following comments on take-off speed and rotation speed.

Take-Off Speed

The percentage margins for propeller-driven aircraft in the new PAMC are essentially the same as those in AMCs Nos. 1 and 2, illustration 2. However, it will be appreciated that the actual margin varies according to whether V_s or V_{s1} is used. In order to assess this effect we will consider, in turn, a hypothetical 4-engined propeller driven airplane and a hypothetical 4-engined future jet airplane.

Let us assume that the 4-engine propeller drive aircraft has a free air stalling speed $V_{s1}=110$ knots. A take-off safety speed of 1.15 $V_{s1}=127$ knots would be required by the AMCs.

However, as mentioned previously, V_s, as defined in the PAMC and the present U.S. regulation, may be as much as 7 knots lower than V_{s1}. We will assume, therefore, that $V_s=103$ knots; V_2 min. will then be 1.15 $V_s=119$ knots. Putting this in terms of V_{s1}, the minimum take-off safety speed $=1.08$ V_{s1}, i.e. 8% above the free air stalling speed.

The actual margin will, of course, be given by the difference between V_2 min. and the power-on stalling speed with one engine inoperative. The latter will be less than V_{s1} due to the propeller slipstream effect and a conservative figure to assume would be $0.94 \times V_{s1}=103$ knots. Thus, V_2 min. $=119$ knots $=1.15 \times 103$ knots and the actual margin available may be 15%.

For the 4-engine jet aircraft, on which the application of power does not result in a significant reduction in the one-engine inoperative power-on stalling speed due to the absence of the propeller slipstream effect, the margin for the take-off safety speed has been increased to 1.2. However, the use of the minimum speed in the stall, V_s, again reduces the apparent margin.

Assuming the same stalling speeds as before, i.e. $V_{s1}=110$ knots and $V_s=103$ knots, V_2 min. $=1.2$ $V_s=124$ knots.

Now 124 knots $=1.13 \times 110$ knots, i.e. 1.13 V_{s1}. Hence the margin above the free air stalling speed, which is generally about the same as the power-on stalling speed in the case of the jet airplane, is 13%.

As mentioned earlier, the new U.K. regulations limit V_s to 96% of V_{s1} for the type of aircraft which we are considering. Therefore, the minimum take-off safety speed would be $1.2 \times 106=127$ knots and 127 knots $=1.15 \times 110$ knots, i.e. 1.15 V_{s1}. The actual margin is thus increased from 13% to 15%.

It has been stated above that the power-on stalling speed will be generally about the same as the free air stalling speed. In certain cases, however, there may be an adverse ground effect on the stall. For instance, take the case of a swept-wing jet aircraft having a power-on stalling speed, close to the ground, 5 knots higher than V_{s1}, i.e. 115 knots. Then with V_2 min. $=124$ knots, as required by the PAMC, the actual margin would be only 9 knots or 8%.

However, in the next section, it will be seen that the rotation speed V_R must be greater than 1.1 times the minimum unstick speed V_{MU} and this would eliminate the possibility of selecting a V_2 speed which is too close to the power-on stalling speed.

The figures obtained in the above examples are compared in illustration 3.

Rotation Speed

The new concept of rotation speed has been introduced because of the difficulty of preventing the aircraft in illustration 4 from accelerating on leaving the ground, even with one engine inoperative, and thus exceeding the V_2 speed during the initial climb away. The considerable loss of performance which can result from this effect is clearly shown in the following extract from a report of the Lockheed Aircraft Corporation.

ROTATION SPEED

New PAMC	AMC No. 1	AMC No. 2
The rotation speed V_R, in terms of calibrated airspeed, should be selected by the applicant except that it should not be less than: a) The speed V_1; b) A speed equal to 0.95 V_2 min; c) A speed which permits the attainment of the speed V_2 prior to reaching a height of 10.7 metres (35 feet) above the take-off surface, with one engine inoperative; d) A speed equal to 1.10 V_{MU}*, except that for airplanes where V_{MU} is limited by landing gear geometry or elevator effectivness —a speed equal to 1.05 V_{MU}. * The minimum unstick speed V_{MU}, in terms of calibrated airspeed, should be the minimum speed above which the airplane, with all engines operating, can be made to lift off the ground and continue the take-off without displaying any hazardous characteristics.	No Equivalent	No Equivalent

Illustration 4

"Should V_2 be exceeded either during the ground run or during the initial climb, a substantial penalty must be paid in take-off runway length or height at any given point. Since the aircraft is travelling at approximiately 200 feet per second at V_2, it may be seen that any delay in breaking ground uses up runway at a substantial rate. For each knot of speed above V_R, the height over the fence will be decreased by approximately 10 ft.
"Alternatively for an acceleration (above V_2) of one knot per second in accelerating to normal climb speed, the rate of climb is decreased by an amount over 600 feet per minute. By comparison 600 feet per minute is approximately the loss in rate of climb which accompanies engine failure."

The four limitations placed on V_R will now be considered.

The first requirement (a) ensures that rotation does not occur during that part of the take-off run where it is still possible to carry out an accelerate-stop. Thus, if full braking action is required at, or just before V_1 speed due to engine failure, the possibility of the nose wheel being off the ground is obviated. Adequate control is also ensured since the definition of V_1 states that V_1 must not be less than the minimum speed at which adequate controllability by primary aerodynamic controls alone can be demonstrated during the take-off run, when the critical engine is suddenly made inoperative.

The second requirement (b) must be considered in the light of the new V_s, the minimum speed in the stall. Considering the propeller driven aircraft of our previous example, .95 V_2 min. $=.95 \times 1.15$ $V_s=1.092 \times 103=113$ knots, which is only 3 knots greater than the stalling speed V_{s1}. This is, of course, alleviated to some extent by the slipstream effect. For the pure jet aircraft, .95 V_2 min. $=.95 \times 1.20$ $V_s=1.14 \times 1.03=117$ knots, or 7 knots above V_{s1} with, of course, no slipstream effect.

The third requirement (c) permits the aircraft to be climbed away initially at a speed lower than V_2 and, in view of the remarks already made, concerning the take-off safety speed margins, it may be considered that this requirement is unacceptable.

The fourth requirement (d) has been introduced as a safeguard in cases where there is an adverse ground effect on the stalling speed similar to that mentioned in the example of the 4-engined jet aircraft.

In view of the above remarks, therefore, it is considered that the definition of rotation speed would be acceptable provided requirement (c) is altered to read: "(c) A speed which ensures the attainment of V_2 at the time of becoming airborne."

ACCELERATE-STOP DISTANCE

New PAMC	AMC No. 1	AMC No. 2
The accelerate-stop distance should be the sum of the following: a) the distance required to accelerate the airplane from a standing start to the speed V_1; b) Assuming the critical engine to fail at the speed V_1, the distance required to bring the airplane to a full stop from the point corresponding with the speed V_1. In addition to, or in lieu of, wheel brakes the use of other braking means should be acceptable in determining the accelerate-stop distance, provided that such braking means have been proven to be safe and reliable, that the manner of their employment is such that consistent results can be expected in service, and that exceptional skill is not required to control the airplane. *Note:* The specification relative to the use of the means of braking other than wheel brakes has, in the past, been applied conservatively. It is intended that the specification for accelerate-stop distance be applied so that an adequate level of performance is provided for operations from wet runways.	Similar to the new PAMC (without the Note)	Similar to the new PAMC (without the Note)

Illustration 5

DECISION POINT—NORMAL CONDITIONS

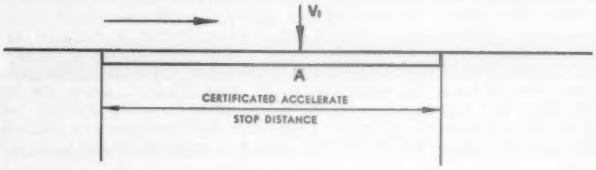


Illustration 6

DECISION POINT—SUB NORMAL CONDITIONS

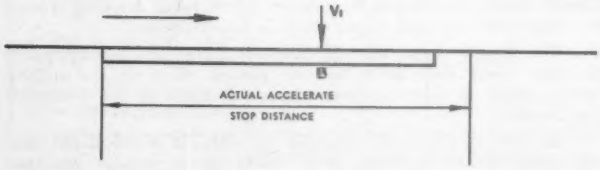


Illustration 7

Accelerate-Stop Distance

No margin is allowed in the requirement pertaining to accelerate-stop distance (Illustration, 5) which is only adequate, therefore, when the performance up to the V_1 speed is normal. If, in fact, the performance is below normal, which may occur quite frequently in day-to-day operations due to variations in engine power, puddles on the runway, etc., the decision speed will not be reached until a point (B, illustration 7) farther down the runway from that (A, illustration 6) obtained in the certification tests. Hence, if the take-off is aborted anywhere between these two points (A and B) an incident will occur.

The note at the end of the PAMC does not go so far as to say that no credit should be taken for reverse thrust. It does, however, sound a note of warning and indicates the concern felt by the Airworthiness Committee about the adequacy of this specification.

In the Performance Operating Limitations of the PAMC, the accelerate-stop distance is defined as the length of runway plus the stopway. The use of stopway is an additional hazard in the accelerate-stop maneuver for two main reasons: (a) The braking coefficient of the stopway is generally lower than that of the runway, thus increasing the already high probability of an incident; (b) The bearing strength of the stopway is generally insufficient to allow the aircraft to be brought to rest without damage. These defects apply particularly to the grass stopways which are often provided and which furthermore become unservicable after rain. For these reasons, the Federation is unable to accept the concept of a stopway.

Take-Off Distance

The introduction of a factored distance (illustration 8) for the all engines operating case results from the realization that power-unit failure at the critical point may not be the worst situation. As mentioned in discussing accelerate-stop distance, sub-standard performance during the take-off run with all engines operating will result in the distance covered to reach take-off safety speed being greater than anticipated and thus adversely affecting the safety of the take-off operation. This effect will become even more critical with jet aircraft due to, among other things, the lower average and almost steady acceleration making it extremely difficult for the pilot to detect a decrease in power and the fact that, far more frequently than at the present time, the available runway length will not be in excess of that required.

The 15% margin incorporated for the all engines operating distance may at first appear to be a reasonable safeguard. It must be remembered, however, that in comparison with AMC No. 2 (4-engined aircraft), the screen height has been lowered from 50 ft.[1] to 35 ft. and the unstick speed has been reduced by the new concept of rotation speed. All these measures reduce the margin formerly existing between the actual take-off distance in service and the required runway length.

Two members of the Airworthiness Committee stated at the second meeting that they were of the opinion that, in the light of studies and experiences in France and the United Kingdom respectively, it would be necessary to apply a factor of 1.18. IFALPA fully endorses this opinion, believing that a more conservative figure is essential, particularly since it is understood that analysis of the probable variability of take-off distance indicates the need for a factor of 1.25. At the present time, this variability cannot be limited to any great degree owing to the fact that there are a number of factors which it is difficult to apply operationally. For instance, insufficient information is available regarding the effects of standing water, slush, pavement deflection and wind variation. However, the Federation believes that the variability of take-off performance can be controlled to some extent by the use of a suitable take-off monitor and this, combined with an increased margin, might then achieve an adequate level of safety.

Take-Off Run

The use of stopways and clearways is permitted in both AMC No. 1 and AMC No. 2 pertaining to take off run (illustration 9).

When there is no stopway or clearway, the screen height at the end of the runway will be 35. ft. (illustration 10). When maximum credit is taken for both stopway and clearway, the screen height at the end of the runway will be reduced to approximately 10 ft. (illustration 11). As explained previously the Federation is unable to accept the concept of a stopway.

The same arguments given for increasing the take-off distance margin and for the introduction of a suitable take-off monitor also apply to the take-off run, particularly in view of the fact that the screen height can be as low as 10 ft.

[1] AMC No. 1 also requires a screen height of 50 ft. but this is without temperature accountability and hence the mean screen height achieved is nearer 35 ft.

TAKE-OFF DISTANCE

New PMAC	AMC No. 1	AMC No. 2
The take-off distance is the horizontal distance to attain a height of 35 ft. with one engine made inoperative at the critical point, or 1.15 times the all engines operating distance.	The take-off distance is the horizontal distance to attain a height of 50 ft. with one engine made inoperative at the critical point.	The take-off distance is the distance required to reach 35 ft. for twin-engined aircraft, or 50 ft. for 4-engined aircraft, with one engine made inoperative at the critical point.

Illustration 8

TAKE-OFF RUN

New PAMC	AMC No. 1	AMC No. 2
Take-off Run If a stopway and/or a clearway is used, the Take-off should be the greater of:— a) the horizontal distance to a point equidistant between the point where the airplane first becomes airborne and the point where it attains a height of 35 ft., one engine inoperative. b) 1.15 times the horizontal distance to a point equidistant between the point where the airplane first becomes airborne and the point where it attains a height of 35 ft., all engines operating.	No specification	The Take-off Run is the horizontal distance to the Take-off Safety Speed with one engine inoperative or 1.15 times the all engines operating distance.

Illustration 9

In illustration 12, the requirements of AMC No. 1 are omitted since it is generally agreed that it is no longer practical to define rates of climb for jet aircraft in terms of stalling speed.[*]

Definitions of Take-off Flight Path Segments:

1st Segment: This extends generally from the end of the take-off distance to the point at which the landing gear is fully retracted. 2nd Segment: This extends from the end of the 1st segment to a height of 400 ft. 3rd Segment: This extends from the end of the 2nd segment to the point at which the take-off power time limitation is reached, or 1,500 ft., whichever is the lesser.

If the airplane is flown level at 400 ft. while the speed is increased and the flaps retracted, this part of the flight path becomes the 3rd Segment and the following climb is then the 4th Segment.

The net flight paths, which result from application of the PAMC and AMC No. 2 when an aircraft is operating to the take-off climb limits, have been plotted in illustration 13. These paths represent the minimum obstacle profiles which the aircraft would be able to clear safely.

For comparison, the effective obstacle profile of a typical turboprop transport has also been plotted. An airplane will normally be limited in one segment only and will have better than minimum performance in the other segments. In this particular case, the record segment is the limiting one.

[*]This is best illustrated by an example: In AMC No. 1, the specified rate of climb in the 2nd Segment is 465 $V_{S1/100}$ ft. per minute, where V_{S1} is the stalling speed in knots for the particular configuration being considered. In the case of an aircraft where V_{S1}=120 knots, the rate of climb required with one engine inoperative is therefore 670 ft./min., which is equivalent to a gradient of approximately 55%. This is greatly in excess of even the most conservative figure for this segment.

SCREEN HEIGHT—NO STOPWAYS, CLEARWAYS

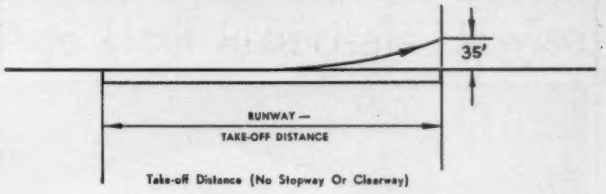


Illustration 10

SCREEN HEIGHT WITH STOPWAYS, CLEARWAYS

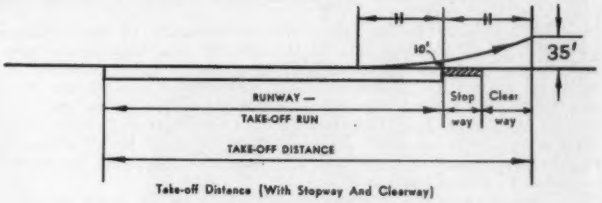


Illustration 11

CLIMB AND EN ROUTE GRADIENTS

Flight Path Segment	New PAMC			AMC No. 2		
	Gross	Margin	Net	Gross	Margin	Net
Take-off						
1st Segment gear down, prop feathered	.5%	.....	.....	.5%	.....	.....
*1½ Segment from 35 ft. height for 1,000 ft. horizontally (net flight path)	.....	.....	.....	1.3% (1.0%)	.8% (.5%)	.5%
2nd Segment gear up	3.0% (2.4%)	1.0% (.8%)	2.0% (1.6%)	2.8 % (2.5%)	.8% (.5%)	2.0%
3rd Segment final take-off	1.5% (1.2%)	1.0% (.8%)	.5% (.4%)	1.2% (1.1%)	.7% (.6%)	.5%
En Route						
One engine inoperative	.....	1.4% (1.1%)	.....	.....	.9%	.....
Two engines inoperative	.....	.5%	.....	.....	.2%	.....

Illustration 12

Figures in brackets are for twin-engined aircraft.

*This additional segment takes into account aircraft having a slow gear retraction time.

TAKE-OFF FLIGHT PATH

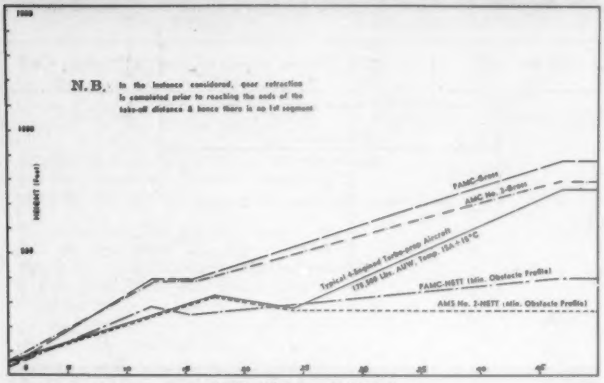

N.B. In the instance considered, gear retraction is completed prior to reaching the ends of the take-off distance & hence there is no 1st segment
HEIGHT (Feet)
PAMC-Green
AMC No. 1-Green
Typical Adopted Turbo-prop Aircraft
170,500 Lbs. AUW; Temp ISA + 15°C
PAMC-NETT (Min. Obstacle Profile)
AMS No. 2-NETT (Min. Obstacle Profile)
DISTANCE (x 1000 Ft.)

Illustration 13

As in this particular case, the performance of the turbine-powered aircraft in operation at the present time is generally considerably greater than the minimum required by the regulations. It must be appreciated, however, that the performance of the next generation of aircraft may well be down to this minimum and it is in this light that the requirements must be considered. Since it is difficult to assess the exact level of safety achieved by a particular specification, it is recommended that the climb gradients should be accepted on a trial basis only.

There has been a growing realization in recent years that the existing landing distance requirements, as laid down in the AMC's (illustration 14), are inadequate and considerable concern has therefore been expressed at the Second Meeting of the ICAO Airworthiness Committee because the requirements proposed in the PAMC are virtually the same as those in AMC No. 1. This concern is well founded since, although AMC No. 1 permits the use of reverse thrust, it is understood that this credit has not actually been applied save in one or two exceptional cases. Thus the PAMC requirements are in effect less stringent than those in the AMC.

Furthermore, this landing problem, which already exists with piston-engined aircraft, will be greatly accentuated in the case of jet aircraft due to such characteristics as higher approach speeds, residual thrust when the throttles are closed, absence of propeller windmilling effect, etc., and the fact that it is anticipated that jet aircraft will have to carry out a higher proportion of landings on runways of critical length.

The margins for this flight stage in the existing and the proposed regulations are based on the empirical method and although a proposal has been made for a landing distance requirement based on the rational method, this requires further development before it can be made suitable for trial application. It is considered, therefore, that until a rational specification is available, interim measures should be taken in order to ensure the necessary level of safety. An IFALPA Airworthiness Study Group has made the following recommendations:

- Landing distance should be measured without the use of reverse thrust devices.

LANDING DISTANCE

New PAMC	AMC No. 1	AMC No. 2
(a) Regular Airports. The landing distance = 1.67 times the horizonal distance to land and stop from a point 50 ft. above the landing surface. (b) Alternate Airports. The landing distance = 1.43 times the horizontal distance to land and stop from the 50 ft. height point. Use of reverse thrust is permitted but, as in the case of the accelerate-stop a note is added to the effect that an adequate level of performance should be provided for operations involving wet runways.	The margins applied are the same as for the PAMC. The definition is worded differently, however, and the margins expressed as percentages. Reverse thrust may be used.	The landing distance = 1.43 times the horizontal distance to land and stop from the 50 ft. height point for regular *and* alternate airports. Use of reverse pitch or thrust is *not* permitted.

Illustration 14

- Non-skid brakes should be mandatorily fitted;
- Full temperature accountability should be used;
- For jet airplanes not fitted with reverse thrust, the landing distance should be equal to 2.0 times the horizontal distance to land and stop from the 50 ft. height point. For jet aircraft fitted with reverse thrust, and for propeller turbine airplanes not fitted with reverse thrust, the landing distance should be equal to 1.82 times the horizontal distance to land and stop from the 50 ft. height point. For propeller turbine aircraft fitted with reverse thrust, the landing distance should be equal to 1.67 times the horizontal distance to land and stop from the 50-ft. height point. No differentiation should be made between regular and alternate airports.

Conclusion

As previously stated, even with a performance code based on the rational method, it is still extremely difficult to assess the exact level of safety which will be achieved during a particular flight. For this reason it is essential that conservative margins should be adopted for those requirements over which doubt exists.

The general principles of the new PAMC are acceptable, but IFALPA is gravely concerned at the present margins allowed for the take-off and landing distance stages. It was apparent at the second meeting of the ICAO Airworthiness Committee that this concern is shared by others. Final responsibility for the safety of an aircraft and its passengers rests with the pilot-in-command and the Federation believes, therefore, that it must do all in its power at the third meeting of the Airworthiness Committee to secure an increase in the margins of these particular flight stages.

IFALPA is also of the opinion that some of the flight path climb gradients are inadequate but considers, nevertheless, that these can be accepted on a trial basis with the object of amending them if actual operations show that the level of safety achieved is too low.

IFALPA

About IFALPA

Maintenance of universally high safety standards throughout the world is one of the principal objectives of the International Federation of Air Line Pilots Associations. IFALPA does this through the International Civil Aviation Organization, serving as observer and technical advisor. The preceding report on International Performance Regulations is the result of one of these projects.

On Sept. 28, another ICAO project, jet operational requirements, will be discussed in a panel at Montreal. ALPA President Sayen will attend as a member of the U. S. delegation. He is also IFALPA President, re-elected recently to his seventh consecutive term.

IFALPA represents 34 pilots' associations from 33 countries. Its purpose is the uniting of all air line pilots for the protection of their interests and the promotion of their general welfare. Its cardinal aim is the development of a safe and orderly system of air transportation and the cultivation of a spirit of harmony and understanding between air line pilots' associations. Unity of Purpose is the motto of the organization.

Senator Goldwater Calls FAA Age Limit Proposals Unwise

Because of its broad implications, not only in the aviation industry, but in other industries as well, compulsory pilot retirement proposal of the Federal Aviation Agency is drawing considerable interest and reaction.

Among those commenting have been members of Congress. Some comments and reactions:

▸ *Senator Barry Goldwater (R-Ariz.), himself a World War II pilot and still actively flying, in response to a question posed by Bill Lawrence of the New York Times and President of the National Press Club following Senator Goldwater's appearance as a guest speaker:*

"I don't think that . . . frankly, I think that the rule is not a wise rule for this reason. I think that as long as a man can pass his annual physical, and in the case of airline pilots it is as many as three physicals a year, that he should be allowed to fly and should be allowed to check out in new equipment. Now, as a pilot of 30 years, I am tickled to death that my sons do not have to learn to fly propeller-driven aircraft. They were dangerous. These jets are simple to learn to fly. The big trouble with this is the mutiplicity of gadgets, and buttons, and new radios, and . . . particularly, new rules that you have to learn in order to fly. But, they are extremely safe. I have a friend on the west coast who is a Major General in the Air National Guard. I believe he is over 60, and he checked out in the (F) 106 the other day, which is a Mach 2 airplane. I think it is a mistake to say to a man that he can't check out in an aircraft after he is 55 years of age. Now, if it involves a solo flight . . . a single seater airplane . . . that might be something else, where he might have a heart attack and cause his own death or the destruction, too, of valuable equipment. But in an airliner, where you have a pilot, and a co-pilot, and a third pilot, and an engineer . . . the Lord acts in strange ways, I have heard of two engines quitting . . . but I have never heard of two pilots 'quitting' at the same time. In today's modern equipment, I see no reason in the world why a man should not be allowed to check out in aircraft when he is 60 or 65, . . . or any age. I am going on 51. There is many a time I have gotten up in the air and I have wondered what in the hell I was doing there, but I don't intend to quit flying until the good Lord makes me, or until the flight surgeon says no."

Senator Barry Goldwater (r.), Himself a World War II Pilot and Still Actively Flying is Shown With Bill Lawrence of N. Y. Times (l.) at National Press Club Where he Said He Thought FAA Age Limit Proposals for Pilots Were Unwise.

Smather Questions Rule

▸ *Senator George A. Smathers, in a letter to the FAA Administrator, wrote: "I am informed that the Federal Aviation Agency has given notice of a proposed rule (regulation docket No. 40-41-42) concerning compulsory retirement for commercial airline pilots upon reaching the age of sixty years.*

"As you know, I am greatly interested in factors which affect air safety and heartily endorse any action that you might take which would result in making air travel more safe. In this regard, I would like for you to look upon my subsequent remarks as more of a comment on the question that you propose, rather than a conclusion, inasmuch as I do not know the answer and am looking to you for guidance and assistance.

"The obvious question emanating from your proposed rule is: upon reaching the arbitrary age of sixty, does the efficiency and performance of a commercial airline pilot decline to the point that safety factors become involved and he is unflt to continue his duties as a pilot?

"The answer to this question of compulsory retirement is important, not

(Continued On Page 28, Col. 3)

As Others See It

Excerpts from Comments in
The News of Interest to Pilots

Forced Retirement: *From a CBS broadcast, John Harrington's "It Happened In Chicago!"*

Another voice has been raised in defense of the aging . . . and we think it's worth reporting. The "heavy" in this real-life drama is the Federal Aviation Agency. The FAA is proposing that all air line pilots be forced to retire at the age of 60 . . . regardless of competency and physical condition . . . and that five years *earlier* — at age 55 — they give up flying *jet* airliners.

The hero in the act, as far as thousands of pilots are concerned, is C. N. Sayen, President of the Air Line Pilots Association. You and I are involved as spectators because, at one time or another, nearly all of us ride an airliner. And all of us, we hope, expect to live to grow old, so we're interested in the argument over aging, too.

The FAA's side of the proposal, so far, isn't well known. In fact, the pilots' association is asking the FAA what it is. But Sayen's side is spelled out clearly. Sayen . . . a former air line pilot himself . . . says no one has been able to show a connection between a pilot's age and the cause of air line accidents.

In the last 13 years, only 27 air line accidents were attributed to the commanding pilots . . . and most of these men were in their *30s* — NOT in their 60s. Actually, the *oldest* was 50. Not one air crash has been attributed to the age or physical breakdown of the pilot. No air line pilot over 55 has ever died in flight. Pilot incapacitation from such causes as food poisoning or acute indigestion may occur at *any* age.

Sayen says: "The public should not be led to believe that age restrictions on pilots will provide protection against in-flight incapacitation." *Present* regulations, he says, provide for a pilot to give up flying an airliner whenever his proficiency or health deteriorates . . . as determined by *functional* age rather than *chronological* age. Sayen says there is no substitute for experience, and he quotes an eminent doctor as saying: "The aging pilot who has maintained his functional capabilities is no problem. He is a very valuable piece of human equipment."

So there you have it . . . part of the argument against a government proposal to retire the men who fly the airliners on the basis of age alone. The outcome of the dispute will be watched with interest not just in this country but around the world. And the job of opposing forced retirement for age alone is being handled locally. It's happening right here in Chicago.

Economies and Salaries: *From a story by Tom Gavin in the Denver Rocky Mountain News.*

Growing economic pressures will soon force a number of air line companies to either merge or die, United Air Lines President W. A. Patterson predicted in Denver Friday.

But Patterson at the same time stoutly defended the rising level of air line pilots' salaries.

Patterson, addressing more than 70 civic and business leaders at the Denver Country Club, defended pilots against feather-bedding charges.

Statements that pilots have demanded a fourth man in the cockpit are not true, he said.

"They have asked that the third man —who's now in there—be pilot-qualified so that he might take over control of the plane in an emergency. And we agree," the United president said.

Those air lines now using a fourth man in the cockpit are doing so because they signed a 5-year contract with flight engineers while they were still bargaining with the pilots' organization, he said.

United's flight engineers are being given the opportunity of taking pilot training, at the company's expense. Those who cannot qualify can continue in piston engine craft or, at the end of 1961, can choose to resign with severance payments as high as $20,000.

Patterson defended pilots, too, against charges their $28,000 to $29,000 a year jet flying salaries are too high.

They are flying $5 million planes, he noted, and will be responsible for more than 120 human lives on each flight.

"That plane's productivity and safety depends on the pilot's mind, his knowledge and his experience," he said.

"I have no argument with $29,000 men. I will only object if we pay $29,000 for an $18,000 man."

only in the air carrier field but in other transportation fields and in other walks of life. The airline pilot, the railroad engineer, the steamship captain, the bus and truck driver, and the general public, in receiving their drivers licenses from the state in which they reside, are all facing the same broad standard as they become sexagenarians.

"In my years as a legislator, it has been necessary for me to study this question from many viewpoints as we consider social security legislation, insurance legislation, and the like. The question is not an easy one to answer, as I am convinced that each individual ages at a different speed with many factors such as environment, exposure, experience, basic physical and mental health, all affecting the rapidity of decline from our peak years.

"Quite honestly, I have never considered before the question of compulsory retirement at an arbitrary age grouping *for safety reasons.* Nor have I considered it from the standpoint of a relatively small group of people where individual examination would not constitute an undue burden to the administration of the law.

Arbitrary Ending Age Dangerous

"I belive that, at the present time, certain standards have been selected for persons desiring various types of licenses in which the public interest is involved. These standards are based upon physical abilities and general or particular health requirements rather than the age of the applicant. The only age requirement that I can recall is the requirement that a person be a certain arbitrary age before he can *begin* performance. This is not only true in the transportation field but throughout other fields, such as the holding of political office, the right to vote, the right to consume alcoholic beverages, the right to marry, the right to enter a legal contract, and many others. Such an arbitrary *beginning* age is based upon public policy. It distresses me that we are now considering an arbitrary *ending* age, when a person must cease doing something because he has reached X years in his path through life.

"Such a trend is a dangerous one to permit to start, for our later years should be years of fulfillment and enjoyment rather then years of restraints and prohibition. Nature itself, unfortunately, regulates all of us much too soon without the need of legal statutes.

"I have been humbly grateful for the advances made in medical science during the past fifty years. Man's life span grows longer with each new discovery. It has been said that our American pace of life is a killing one, yet I believe that,

by moderation, the stimuli and progress derived from such a pace does much to prolong the physical and mental deterioration of our declining years. I know of no better example to cite than our former President Harry S. Truman, who at 75 is today as active as most men of 40. It would have been an offense bordering on the criminal to, by law, force such a man into retirement 15 years ago.

I am confident that modern medicine has reached the age whereby, through clinical tests and examination, it can reasonably determine the capabilities of an individual. It is true that different doctors will disagree in diagnosing the same facts, but the occasional mistake in interpreting the physical condition of an individual cannot be in to approach the enormous error we would incur in legislating the end of a man's life work. Such legislation could only result in disappointment, frustration and decay.

Asks for Basis of Rule

"I apologize to you for the length of my remarks, but perhaps my verbosity can convey my extreme interest in the subject. I would appreciate it if you would advise me of the medical fraternity's remarks on your proposed rule, as well as your own thoughts. As I mentioned earlier, I am looking to you for guidance and assistance.

"In closing, I would like to commend you on your proposed rule, 'Approval of Training Programs and Certification and Qualification Standards of Pilots other than Pilots in Command.' It is significant to note that when co-pilots receive the same training as the pilots and are qualified and certified in the aircraft in which they are flying, the improbable instance of a pilot becoming incapacitated due to his age is not frought with the same danger as such an instance when the co-pilot does not have a type rating in the aircraft."

Opposes FAA Age Rule

▸ *Representative Sidney R. Yates, in a letter commenting on information ALPA provided members of Congress, wrote:*

"I am very much interested in the FAA proposal to apply maximum age limitations to pilots and intend to oppose it. I would appreciate receiving as much information as you can furnish me on the issue.

"I have frequently taken the position in the Congress in the past against maximum age limits in any form, arguing that a person's skills and qualifications, physical and otherwise, should be the exclusive test of his capacity to hold a job rather than his age. It was my amendment to the Independent Offices Appropriations Act of 1957, which the Congress accepted, which prohibited the Civil Service Commission from using maximum age as a factor in employment for any Federal position. It is now the law in the Federal Government, and I have been endeavoring since that time to have the same idea adopted by industry where there is so much discrimination in employment because of age."

Prominent Arbitrators Reject Age As Retirement Criteria

Prominent arbitrators in the field of aviation are upholding the Air Line Pilots Association contentions that it is improper to involuntarily retire pilots because of age when they meet health and proficiency standards.

This is apparent in an arbitration decision involving a pilot on Western Air Lines, which is the second such decision since last November. Both decisions were reached by prominent and experienced arbitrators after lengthy evidentiary proceedings in which all parties had an opportunity to present any pertinent evidence, examine witnesses and submit briefs under normal legal procedures.

The current arbitrator's decision on Western Air Lines is of especial and timely significance because of recent proposals to establish maximum age limits for pilots.

Background of Decision

Western Air Lines had attempted to involuntarily retire Captain Fred T. Kelly, an experienced, capable veteran pilot with thousands of flying hours and millions of air miles to his credit. The pilot contested his discharge and a neutral arbitrator was appointed by the National Mediation Board to sit with a panel of pilot and company representatives to hear and decide the case. In endeavoring to force Captain Kelly to retire, the company contended that the pilot having attained age 60

(Continued On Page 34, Col. 2)

Rep. John Jarman (D-Okla.), shown here with a group of PAA pilots, stated in a recent speech before the House of Representatives that "the U. S. needs a consistent and wise policy with regard to international aviation and a soundly conceived air merchant marine which would be able to compete with the foreign subsidized and government owned lines."

One Reaction To The Recent ALPA-FAA Letter Exchange

(While the following letter was not addressed to THE AIR LINE PILOT, *a copy was sent to the Association and it is being reprinted with the author's full consent and knowledge.)*

July 1, 1959

FAA Administrator,
E. R. Quesada,
Washington, D. C.

Dear Sir:

The NBAA recently sent me a copy of two letters, one dated May 15, 1959, to you from Mr. Sayen of ALPA and one dated June 12, 1959, from you to Mr. Sayen.

I have read these letters several times and am unable to find justification for the tone of your letter to Mr. Sayen. Nor did your letter answer several specific points raised in Mr. Sayen's letter. The most important point raised is that the regulation quoted by you *does* allow a pilot to leave the flight deck when necessary for the performance of his duties in connection with the operation of the airplane, but does not cite examples of what is to be construed as "necessary." In the broad sense in which the regulation has been heretofore interpreted by the inspectors in the field as well as the pilots, going back to talk to passengers to see if everything is all right was construed as a necessary duty as well as checking the temperature of the cabin, etc., and going to the lavatory. While not challenging the FAA's legal right to change interpretation of a given regulation within the scope afforded by the language of the regulation, Mr. Sayen is nevertheless right in stating that your letter has had the effect of a new regulation, if pilots are now being cited for breach of this regulation for reasons not considered violations in the past. This particular regulation is worded loosely enough so that considerable latitude is available for interpretations. I agree with Sayen that when the FAA undertakes to "tighten" an existing regulation without having it rewritten, the burden should be on the FAA to clarify and set the limits of the new interpretation. Mr. Sayen asked you to specify the maximum time that can be spent in the passenger compartment, how many trips may be made to the cabin, what is justifiable reason for visiting the passenger compartment, or the many other indistinct areas involved. You not only ignored these specific questions, but, nowhere in your letter did you clarify your interpretation of the law. I recognize that you never flew civilian air line aircraft, and therefore do not personally know how the law has been previously interpreted, but that is all the more reason to clarify *your* interpretation. In many other cases representatives of the FAA *do* try to put into effect laws that do not exist. A common one is to be told by an FAA tower that it is not accepting VFR traffic, even though the weather is legally VFR. I do not know of any regulation bestowing this power in the tower, and several months ago I wrote to the chief tower controller at La Guardia asking that I be advised of the regulation giving the tower this authority. I have not received a reply.

Your letter states that similar letters were sent to the Secretaries of the Army, Navy and Air Force as well as to the several organizations representing the private and corporate flier, and that Sayen was the only one to object. This is hardly surprising in view of the fact that the air line pilots are the only group of the several organizations mentioned that are subject to anonymous FAA agents noting their absences from the flight deck while in flight.

You go on to mention a "near-miss hazard." The hazard is not the near-miss; it is the "no-miss," the collision that is the hazard! If we were assured that only "near-misses" would occur, we would be in clover. The CAA-FAA near panic of the so-called near-miss problem has been rather silly. Pilots were asked to report something called a "near-miss" without a near-miss ever having been defined. The resulting reports were of little value. I will cite an example of what I'm talking about. Shortly after passing BAL on a flight to DCA we noted a Martin 404 climbing out from the DCA area about 15 miles away on a course that would bring our two aircraft within a few hundred feet of one another as we were descending at about the same angle as his climb. I mentioned to the Copilot that the Martin probably did not see us and altered course slightly so as to pass him at about 500 feet and at an angle that would obviate any danger of collision with him. Shortly before arriving over Beltsville, we arrived at our closest proximity. At that time we noted that the Martin lifted his near wing suddenly obviously seeing us for the first time and being startled. A few seconds later when we called DCA approach control, the Martin said on the same frequency "Why don't you guys watch where you are going?" I retorted that we had been watching him for the past five minutes. To the Martin pilot, who on raising his head saw another aircraft 500 feet away for the first time, it was a "near-miss." For us it was not.

My stipulation of the conditions necessary for a bonafide near-miss report would be as follows:

1. Neither crew saw the other aircraft in time to alter course with normal control tempo, so as to pass the other aircraft by at least 500 feet.

2. The aircraft involved did in fact come closer to each other than 500 feet with the crews of both aircraft being unaware of the impending proximity.

While the above may not be the ultimate criterion of a "near-miss" it is a start, and one that the FAA should have made if a logical attempt was to be made to count the frequency of near collisions.

Mr. Sayen charged that some FAA agents were unreasonable in their application of the regulation in question but did not name individuals. It seems to me that the proper response was to ask for specific cases, and without taking the position that they did not occur, until no examples could be cited by Sayen upon your request. The cases of action taken by the FAA against pilots, given as examples by you, are cases that have been well publicized, and I do not think they are the ones Sayen was referring to. It is difficult to see in these cases any clear cut guilt upon the part of the pilots, using the interpretation of the law that has been used for many years. Even more disturbing to me is the apparently naive theory that if the pilots had been in the cabin on bonafide operational business, the incidents that occurred would have been any safer. The FAA position as I see it is that the absence of either of the pilots and especially the Captain from the flight deck materially increases the hazard of the flight. The law, and common sense recognizes that individual crew members, including the Captain, may find it necessary to leave the flight deck for bonafide reasons. Pursuing logic further we conclude that neither the airplane nor the natural forces involved know whether the pilot's absence is legal or not, and therefore the increased hazard is present in either case. The logical conclusion, if the above points are true, would be to require an additional pilot to take the place of a pilot who finds it necessary to leave the deck. I believe Mr. Sayen suggests this. You do not comment on it.

You charge that Mr. Sayen requested exemption from the C.A.R. I see no evidence of that in his letter.

You state that the pilot of the DC-7 the FAA found guilty of unauthorized absence from the flight deck, has the option of paying the fine or taking the FAA to court, and that in court, the burden of proving the violation rests with the Department of Justice. "The pilot's rights are fully protected". If the burden of proof would be on the Department of Justice in this case, I would be glad to hear it, but in the past this has not been true. Only a relatively short while ago a Captain Specht was cited for infraction of the regulations by allegedly falsely declaring an emergency. The burden of proof that an emergency *did* exist was placed on Specht, rather than the burden of proof being placed on the CAA to prove that an emergency did *not* exist. On being taken to the appeals court the verdict was in favor of CAA, as the court usually considers the CAA-FAA unquestioned experts. Many people experienced in aviation know that the quality of CAA-FAA experts often leaves something to be desired. The courts usually are impressed by the government agency. The result is that very often a pilot charged with a violation is *not* accorded the advantage given to every accused criminal in the U.S.—that the burden of proof is on the accuser.

You charge a note of "intimidation" in Mr. Sayen's letter. I assume you allude to his statement that unless common sense is injected into the enforcement of the regulation in question, deterioration of respect for the FAA inspectors by the pilots will result. I fail to see intimidation in this statement of fact. No man respects another whom he considers unfair, nor is he usually willing to co-operate with him.

You state that Congress has commissioned the FAA to provide for the safety of the flying public. I have been an active pilot for 30 years, and it has been my observation that the pilots have had a more positive role in the development of aviation safety than

the government agency "charged by Congress" ever has had. Day in and day out pilots make aviation safer by requiring much greater safety than the C.A.R. require. The 45 minute fuel reserve regulation is a prime example. No pilot in his right mind today takes off with only enough fuel to go to his destination, alternate plus 45 minutes in IFR weather as the law allows. If pilots did, aircraft would be killing many more people every year due to running out of fuel. But under present regulations it is legal!

It is obvious to me that the FAA, along with several other groups are concerned with collision between aircraft out of all proportion to this particular hazard relative to other hazards aircraft are exposed to. More people have been killed in aircraft making low approaches for instance, than by collision between aircraft. Yet little comparatively, is being done to reduce these accidents, even though reasonably simple changes such as increasing minimums would save many lives. Although some little increased safety might accrue by the tightening and increasing of regulations applied to pilots, it is a drop in the bucket to what increased safety would be achieved by recognizing and requiring the developments such as airborne radar, perhaps the greatest single contribution to increased safety of aircraft in flight since World War II, be carried in scheduled air carrier aircraft. By fighting against budgets that result in cuts and deterioration to such vital factors to flight safety as the weather bureau, and navigational facilities such as glide slopes on back courses as well as approach lights, and stand by power units. By requiring ARTC to recognize that hazards other than collision between aircraft exist, particularly in view of the trend for the pilot to become a servo, operating the controls in response to emissions from the ground (it is called radar vectoring). In other words people on the ground are steering the airplane, yet accept no responsibility for dangers they may steer it into except for collision. On more than one occasion we have been directed into a dangerous thunderstorm after we advised them of its presence.

Instead of forthrightly attacking the foregoing hazards the FAA elects to concentrate on the pilot—and then, in areas that have caused no known transport aviation accidents, such as instigating tighter physical examinations for pilots and proposing to establish a maximum age. These latter can only be ascribed to military thinking in the FAA as no evidence supports the need for change in this area. In fact wherever comparison has been possible, the evidence is otherwise.

In the past civilian pilots, not subject to the strict physical and age limits of the Air Forces, flying equivalent aircraft have compiled better safety records. Almost anytime an aircraft is lost, and holding all traffic up in an area, and often running out of fuel and landing on parkways etc., it is a military pilot or an amateur pilot with little equipment aboard. The military pilot usually has adequate equipment. I and many others ascribe the relatively frequent trouble military pilots experience in this area to the military's insistence on youth—with youth's attendent inexperience. On the other hand the old air line pilots, who are the group that has been handed all the new transport aircraft, with few exceptions, with the attendent "bugs" and resultant increased hazard, have compiled a remarkable record when it is remembered that the aircraft they were and are flying are more accident prone until the "bugs" are worked out. By that time the younger pilots are flying them and the older pilots are flying another batch of new models. In the face of this the FAA is worrying about pilot age when many more potentially productive areas for the increase of aviation safety exist with little attention by the FAA. Pilots have been the fall guys for many years. Many of the so-called accidents attributed to pilot error are human engineering error by people other than the pilot. The pilots are the only group in aviation that I can think of that consistently pay for their professional mistakes with their lives. A fact that insures built-in caution in most pilots. It is true that other people also die with the pilot, but he is present which is not true of some of the other people in aviation whose errors cause fatal accidents. I have many friends who are FAA agents, and they are fine top grade aviation people. However, since the war the general level in competence of FAA agents has declined although not nearly as much as some of the other branches such as ARTC. Most pilots I have talked to who have been in aviation for 20 or more years recognize this. We also recognize the reasons, such as relatively low pay and expansion requiring more top grade men than are available, and various decisions that had the effect of weeding out the experienced men and substituting relatively inexperienced men because those latter were ex-GIs. The experienced men had been with the agency throughout the war so of course were not ex-GIs. The seemingly official attitude of the government that it is doing a man a favor to give him a job probably has an effect also. We got along fine with the CAA after the war because that agency had been through the phase which you appear to be going through now (tight physicals, tight application of regulations, etc.,) and found that these methods were not the most productive. The CAA then instituted a policy based on mutual understanding and recognition that no regulation could be written to cover all possible contingencies. The regulations were reworded to allow flexibility, i.e., in the proximity regulation—a specific distance was omitted. This type of regulation is fine if the enforcing agency administers it in the spirit that it was written, which was basically that the operator of the airplane is the best judge. If the pendulum swings the other way, and this concept is no longer applied—but instead enforcement is based on narrower boundaries than before, then the law should be rewritten to define these boundaries clearly, or at least clarify it in the form of a policy letter.

In closing I would like to add that I am not presently an air line pilot; I do not know Mr. Sayen, and I often disagree with ALPA. I mean my criticism to be constructive but know that criticism is unpalatable, and it takes an exceptional recipient of criticism to extract the kernel of constructiveness from the criticism. I hope you are such a man. Many active pilots would hesitate to write this letter to the FAA Administrator for fear of reprisal. I have too much faith in the inherent fairness of our government to seriously hold this fear.

I am not writing this letter under the letterhead of the company for which I am Chief Pilot, for I am writing to you as an American pilot and a private citizen.

Sincerely,

Ernest G. Marquis

P. S. I just received a notice that a pilot may go to the toilet in flight under the provisions of his emergency authority. I classify this as Grade A ridiculous.

Our Radar Wasn't Working

Please allow me to call to your attention a statement made in the April issue of THE AIR LINE PILOT which appears to be in error.

On page Nineteen of this issue the statement was made that North Central, which began radar flights on its Convair 340 flights on April 26th, was the first of the industry's 13 smaller air lines to have planes so equipped.

A number of my fellow pilots noticed this, and asked me to call to your attention the fact that Piedmont Airlines inaugurated its F-27 radar equipped flights on November 14, 1958.

We probably dropped the ball in regard to coordinating with the Public Relations Department at that time, and if so, would like to take this opportunity to rectify this.

J. A. CRAIG, JR., *Chm.*
Public Relations Council #120

(*Mr. Craig is correct. North Central was not the first Local Service Air Line to have airborne radar and, as far as we can determine, the honors do belong to Piedmont. The* AIR LINE PILOT *statement was based on a North Central News release. North Central's Public Relations Department writes: "At the time this release was issued we were, to the best of our knowledge, the first local airline to inaugurate regularly scheduled operations with radar-equipped aircraft. We checked every available source of information at that time and all confirmed this statement. However, we now have reason to believe that we were not the first local airline to use radar in scheduled operation. Information indicates that another airline may have put its radar-equipped F-27's into service before our April 26 inaugurated date."*—The Editors.)

Airport Fire Fighting . . .

I just wanted to drop you a line to express my appreciation for the publication, in the April issue of THE AIR LINE PILOT, of the talk I gave on "Fish or Cut Bait" on the problem of airport fire protection. You certainly did a very attractive job of publishing the article and I am grateful for the attention which you have given to this phase of airport safety. All the support that we can get to advance the provision of adequate airport rescue equipment naturally delights us and the cooperation of the ALPA is an item of pride to us.

GEORGE H. TRYON
Secretary
National Fire Protection Assn.
Committee on Aviation

Your Opinion Counts . . .

Letters . . . we need letters — lots of them! There are many big issues being debated, and we need the pros and cons of the members. So drop us a line!

IS FAA PROPOSAL TO LIMIT MAXIMUM AG

U.S. Aviation Agency Tells of Plans To Ground Airline Pilots Over 60

Washington, June 26 (AP)—The Federal Aviation Agency announced plans Friday to ground all airline pilots over 60 years old and to impose drastic age limits on pilots allowed to command jet-powered aircraft.

The civil air regulations was intended to increase pilot proficiency in the interest of safety for the public.

Age and to ensure greater safety for the public.

The F.A.A. said it intends to:

1. Ground all commercial pilots who have reached their 60th birthday.

2. Bar all pilots 55 or older from commanding jets unless they already had qualified on such planes before reaching 55, or qualify before the end of 1960.

The F.A.A. did not stop with age limits. It also announced that it will:

1. Require FAA-approved training programs for all flight crew members, with the airlines submitting their own programs for review and approval.

2. Require all copilots to qualify on every type of aircraft to which they may be assigned. Present regulations require copilots to pass a test on only one type of plane; subsequently they may fly in other equipment without qualifying.

3. Require that pilots who have operated jet-powered aircraft earlier this year undergo a "refresher" course.

4. Establish a "proficiency check" system, to be commanded by Airlines Inspection Service Director Elmer J. Stiles, American Airlines vice president in New York's East River February 2.

A spokesman said it would give interested parties a chance to file comments before putting the age limits into effect. This undoubtedly will include pilots' unions, the Air Transport Association and individual airlines.

An estimated 250 of the nation's 14,000 active airline pilots are between 59 and 60. About 20 are 60 or older. However, at least half of the 250 are grounded by illness and would not be affected.

The FAA's proposed sweeping new limits on commercial jet pilots would not affect military flying. The age limit for military pilots is 50.

The FAA proposals solve no safety problems because they are aimed at an area where problems are non-existent.

THIS problem has been carefully studied for many years. Where the individual must meet prescribed physical and competency standards, no one has been able to establish a safety problem related solely to chronological age. The FAA has produced no new data or evidence which would establish existence of such a problem. The President of the American Medical Association and many authorities have vigorously opposed compulsory retirement based solely on chronological age.

Health and proficiency, not age, determine whether a pilot can safely fly.

A pilot must undergo at least four checks a year. He receives a physical examination at least every six months, proficiency examinations at least twice a year, and, in some cases, more often. He must meet current physical and proficiency standards. It is the only profession where a person's health and competency are being so continuously evaluated. To stay in the cockpit, the pilot of 60 must be able to meet the equivalent standards of a pilot of 30.

Present regulations accomplish the same thing, but do it without unjustly penalizing the pilot who has been able to maintain his health and proficiency at acceptable levels.

Existing regulations provide for removal from the cockpit of a pilot who cannot meet health, competency or proficiency standards. It is unnecessary to set age limits on jet pilots because if their health or ability do not permit it, they will be unable to qualify for such flying. The air line and FAA must certify their physical fitness and

On June 25th of this year, the Federal Aviation Agency issued a notice of proposed-rule making (Draft Release 59-6) which provoked headlines like this. An unfortunately erroneous impression that the air lines were flying pilots who are incompetent and unsafe because of age was created. The FAA offered no valid basis for its proposals. In the Association's opinion, no safety problem related to age exists. This check list shows why the Association views the FAA's proposal as an unsound and unproductive approach to in-flight incapacitation.

flight proficiency before they are certificated to fly any aircraft. In effect, existing regulations already provide compulsory retirement for a pilot who cannot meet current standards whether this occurs at 20, 30, 45, 60 or 65.

The CAB's records themselves are contra-indicative of the need for such a regulation.

From 1946 to January 1, 1959, there were 87 aircraft accidents involving commercial airliners, according to the CAB. Twenty-seven of the accidents were attributed by the CAB to the commanding pilot. In these mishaps, one captain was in his 20's, 16 were in their 30's, nine were in their 40's and the eldest was 50. From 1946 to the present, the CAB reported, there have been only two fatal airliner accidents involving captain-pilots 50 years of age or older. No incident or accident has been attributed to the age or physical breakdown of the pilot and no pilot over 55 has ever died in flight.

Transition to jet aircraft has not demonstrated any problem related to age.

On those carriers which have simulators and well planned and integrated training programs the time needed to qualify air line pilots in jet aircraft has been even less than anticipated. On air lines without such programs, check out time has been longer.

The air line pilots, whom the FAA would penalize, are transitioning the jets in one-fourth to one-half the time the USAF is checking out its pilots. The USAF time for transition to a B-47 is 300 hours ground school and 40 hours minimum flight time. Reports indicate that the Air Force will probably expand the program to 105 hours flight time, principally for maneuvers. By comparison, the air line pilot check out time is about 160 hours of ground school and 10 to 20 hours of flight training. On one air line utilizing simulators and other modern training devices, pilots have qualified in less than 10 hours of flight training. FAA and company check pilots approve every pilot checking out so there is no question of their being qualified.

The FAA proposal will not insure against in-flight incapacitation.

Since present regulations require a pilot to meet all physical and competency requirements regardless of age and

to be qualified to fly the aircraft to which he is assigned, presumably the proposal is designed to provide protection against in-flight incapacitation.

The Association has made extensive studies of in-flight incapacitation which have revealed that they are predominantly not related to age or to overall health, are not of the type predictable by the medical profession or susceptible to an accurate medical assessment of probability but are generally from such everyday things as stomach aches, diarrhea, food poisoning, etc. The proposal would not provide any protection against such occurrences.

Medical opinion has not produced any evidence to indicate at what chronological age a pilot should retire.

Many medical men are of the opinion that the older pilot is a safe and conservative pilot for air line flying.

In-flight incapacitations occur to pilots irrespective of age or physical health, and is the area where protection must be provided.

The pilots have pointed out to the air lines and the aviation agencies of the government for several years that on some air lines no margin of safety was being maintained in modern aircraft against incapacitation of an essential member of the flight crew. ALPA has conducted detailed studies of the causes of in-flight incapacitation of flight crew members and based on these studies and years of air line flying experience have reached the following conclusions:

(1) There is no relationship between the pilot's age and inflight incapacitation.

(2) Pilot incapacitation may occur at any age and to any pilot.

(3) The main causes of pilot incapacitation are such everyday occurrences as acute indigestion, diarrhea, food poisoning, bird strikes, etc.

(4) In-flight incapacitation is not predictable by the medical profession.

(5) **The only positive protection is the "fail-safe" crew.** This concept has been recognized for many years for the aircraft, its engines and components by regulation and should be extended by regulation to the crew. Mechanically, this "fail-safe" concept provides for alternate components to take over when one fails. For example, if one engine fails, under federal regulations, the remaining engines must be capable of sustaining flight. From a flight crew standpoint, therefore, it requires a fully qualified and trained copilot to take over when the pilot-in-command is disabled or, as has happened, dies in flight. It also requires a third crew member qualified to relieve the copilot.

Originally, the copilot was added to the crew in aircraft which could be flown by one pilot in order to provide relief for the pilot and provide a margin of safety in the event of incapacitation. However, government regulations have lagged behind the development of aviation. It now requires two fully qualified pilots to operate modern high speed aircraft utilizing today's navigation, communications, and air traffic control system even under routine conditions and when assisted by a third crew member. Yet, government regulations do not require that the copilot be qualified to operate the particular aircraft on which he is serving as copilot or that the third crew member be qualified to fly at all! On June 26, 1959, FAA issued a notice of proposed rule making requiring that copilots hold type ratings on the aircraft they fly and periodically show their proficiency. This rule should be adopted as soon as possible.

Many air lines have exceeded federal regulations for many years and require the third crew member to be a pilot. As a result of Association programs, all air lines now carry three pilot qualified crew members on jet aircraft. FAA regulations still do not establish such a requirement.

The FAA proposal will not solve a safety problem but interferes with an industrial relations problem which should be processed under the Railway Labor Act.

The FAA is only empowered to adopt regulations in the interest of safety and has no authority to interfere in industrial relations problems which come under the Railway Labor Act. Some air lines virtually insist that their pilots fly to age 65. Others have not established any retirement age but rely on physical and proficiency standards. While pilots over 60 have been flying for many years, no one proposed an arbitrary government regulation until certain air lines lost arbitration cases under the Railway Labor Act in which they tried to prematurely retire pilots that they conceded were healthy and competent; and the arbitrator ruled that they did not have such authority. While it will not solve any safety problem, enactment of the proposal could raise serious industrial-relations problems.

A healthy and competent pilot arbitrarily forced to retire five years early could have, considering loss of income and reduction in pension payments, his career potential income reduced by more than $200,000. These problems would necessarily have to be processed under the Railway Labor Act to protect the pilot's position.

The air lines would be exposed to an unnecessary financial burden by (1) being deprived of the services of healthy, competent pilots in whom they have invested many thousands of dollars in training and experience and in having to secure and train replacements and (2) in having to restore the career potential earnings of the pilot for a shorter working period.

ALPA's position provides protection and safety without penalizing the individual, reducing the utilization by the company of the pilot's full career, or imposing unreasonable financial burdens on air lines.

The Association subscribes to the maintenance of high physical and professional standards for air line pilots. However, a pilot can and should be able to continue to fly as long as he can maintain adequate proficiency, competency and health standards. Ability to meet these standards, in our opinion as well as that of some of the most eminent authorities in the field, is determined by functional rather than chronological age. Some individuals are functionally young at 65. A pilot who cannot meet proficiency or health standards at 35 or 45 should and does leave the cockpit. A pilot who is competent and healthy at 55 or 60 should be permitted to continue to fly. The root of the problem—possible in-flight incapacitation—can be solved only by adoption of the "fail-safe" concept. The adoption of this proposal without the "fail-safe" crew concept leaves the public without the necessary protection and exposes the air lines to huge expenditures with no positive return.

Make Plans NOW!

Second Annual

HOTEL SAHARA

World Airlines Christmas Party

DEC. 2-6, 1959

COCKTAIL PARTIES
EVERY NITE 6 TO 7 P.M.
WEDNESDAY
Sponsored by Trans World Airlines
THURSDAY
Sponsored by United Air Lines
SATURDAY
Sponsored by Western Air Lines
SUNDAY
Sponsored by Bonanza Air Lines

FRIDAY, DEC. 4th
COMPLIMENTARY DINNER SHOW
Starring KAY STARR
COCKTAIL PARTY
6 TO 7 P.M.
A Surprise Visit From Santa Claus

SPECIAL EVENTS
- COMPLIMENTARY GOLF MUNICIPAL GOLF COURSE SPONSORED BY PACIFIC AIR LINES
- COMPLIMENTARY BOWLING COURTESY SHOWBOAT LANES
- DAILY TOURS TO BOULDER DAM PLUS COURTESY CAB RIDES AS GUESTS OF AVIS-TANNER

SPECIAL RATES
DEC. 2-6

$5 SINGLE **$8** DOUBLE

REGISTRATION FEE: $2 PER PERSON

HOTEL SAHARA
LAS VEGAS NEVADA

FOR RESERVATIONS CONTACT HERB McDONALD

Find Age No Retirement Reason

(Continued From Page 29, Col. 1)

raised safety problems even though he met all health and proficiency standards and that it was the prerogative of the air line in carrying out its safety responsibilities to establish an arbitrary age limit.

The neutral, Carl R. Schedler, after weighing all the evidence, ruled against the company and ordered Kelly reinstated.

Basis of Neutral's Ruling

Despite medical testimony through which the company attempted to prove a relationship between age and safety, Arbitrator Schedler found no basis for such contention and his decision pointed out that "medical testimony given by and quoted by the same expert is in almost hopeless conflict as to the exact age when a pilot becomes a hazard."

Other facts revealed by the arbitrator's opinion and decision were:

1. Temporary physical impairment can occur in a given individual at almost any age, and this is the apparent reason that commercial airplanes carry copilots, regardless of the youth of the pilot.

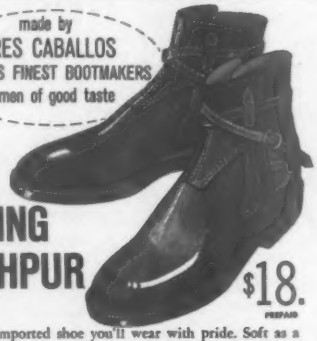
2. The carrier here has shown no relationship between age of pilot and accident frequency from its own experience or from any other carrier's experience.

3. The normal way to determine physical ability or inability is through reasonable and universally accepted medical examinations, which are available to the carrier here.

4. Federal authorities have chosen to attribute nearly all airplane accidents to weather conditions, mechani-

pilots employment associates
Teterboro Airport
Teterboro 5, New Jersey

made by
TRES CABALLOS
MEXICO'S FINEST BOOTMAKERS
for men of good taste



THE **FLYING JODHPUR** **$18.** PREPAID

A fine imported shoe you'll wear with pride. Soft as a glove, comfortable, yet fully leather-lined. Expertly bench made of superb quality leather. Ideal for riding, flying, driving, business, or hiking. Rich Cordovan Brown, Tan, or Black. Sizes 5 to 13. Narrow, Medium and Wide. Order by Mail with satisfaction guaranteed. Sizes 13½ to 15—$3 extra. Send for free folder of other outstanding shoes. Send $2 Deposit on COD orders.

NAVARRO BROS.
DEPT. K • 204 SAN FRANCISCO AVE. • EL PASO, TEXAS

AUTHORS WANTED BY N. Y. PUBLISHER

Leading book publisher seeks manuscripts of all types: fiction, non-fiction, poetry, scholarly and religious works, etc. New authors welcomed. Send for *free* booklet AP Vantage Press, 120 W. 31 St., New York 1.

IFR HOOD

First in Safety! First in Comfort!
First in Pilot's Choice
The modern method of simulated instrument flight for training and maintaining proficiency.
$15.00 at your Airport or
FRANCIS AVIATION
Box 299 U.S.A. Lansing, Michigan

HAVE YOU PLANNED YOUR ESTATE?

Co-ordinated ALL Your Assets? Have a Current Will?

The facilities of our office and of the Massachusetts Mutual Life Insurance Company are available to help you leave a *Planned Estate.*

SERVING AIR LINE PILOTS SINCE 1937

SCHIPPLOCK SALVESEN

ESTATE PLANNING & GENERAL INSURANCE
CHICAGO MIDWAY AIRPORT
POrtsmouth 7-6838 4848 W. 63rd St., Chicago 38, Ill.

cal failure, or other causes, not related to pilot's physical deficiencies.

The previous decision last fall involved involuntary retirement of three pilots on American Airlines who had reached age 60. The physical fitness and proficiency of the particular pilots involved was acknowledged and stipulated by the company. The company, however, contended that establishment of a mandatory retirement age was a company policy prerogative. As in the present decision, Saul Wallen of Harvard University, prominent arbitrator and past president of the American Academy of Arbitrators ruled that the pilots could not be retired because of age alone.

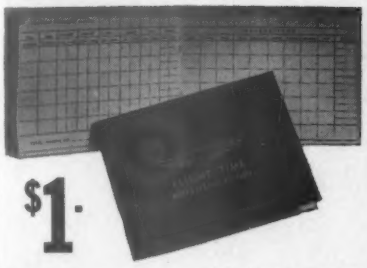
In commenting on these decisions, ALPA President Sayen said: "When viewed impartially and objectively by men trained to ascertain and evaluate all of the facts, it is obvious that the only valid criteria for requiring air line pilots to retire is failure to meet either competency or health standards and, in the individual, this does not necessarily have any relationship to chronological age. Pilots over 60 have been flying for many years and neither the Association nor anyone else has been able to establish any safety problem related solely to this fact. Impartial arbitrators evaluating all of the legal, technical and operational factors involved in the pilots' job have reached the same conclusion."

MOVING ? ? ?

When notifying us of your new address . . . to facilitate our record keeping . . . please send along the mailing label from the envelope showing your old address.

THE AIR LINE PILOT
55th and Cicero, Chicago 38, Ill.

POCKET SIZE
EXPENSE RECORD



$1.

Eliminates need for an additional log book, meets requirements of CAA and Internal Revenue. Last a year. ORDER TODAY $1.00 postpaid.

WILLIAM E. JARY CO.
P. O. Box 1816, Fort Worth, Texas

FOR SALE
IMMEDIATE DELIVERY
North American
AT-6's — T-28's — B-25's
Douglas Boeing Twin Beech
B-26's B-17-G's C-45-H's
THOMPSON AIRCRAFT SALES
2626 E. Washington St., Phoenix, Arizona
Phones: BR 5-5479 or 5-9297
"World's Largest Dealers In Surplus Military Aircraft"

FLORIDA MOTEL with maximum annual return on investment. Rental gross over $68,000 in 1956, over $69,000 in 1957, over $62,000 in recession year of 1958. Buy it for reduced price of $225,000 — only 3.2 times 1957 gross, with only $65,000 (one year's gross) down. For other features of this unusual opportunity, ask for Brief 478-A. **WORTH and WORTH, Realtors,** 602 N. Dale Mabry, Tampa 9, Florida.

MIAMI-BASED PILOTS
LIVE IN THE FLORIDA KEYS!
JUST TWO WATERFRONT HOMESITES available in an exceptionally desirable development at below market prices. Just 90 minutes drive from Miami International Airport. Each homesite fronts on a wide, deep waterway with immediate and direct access to the world's finest fishing waters. Lots are extra high. **YOU CAN BUILD NOW:** Utilities immediately available. Shopping, schools, churches close by. Lot size 70' x 100'. **PRICED FOR IMMEDIATE CASH SALE:** $3,000 each. This price is $800 below market. Phone Owner: Highland 3-0438.

"ILLINOIS MID-CONTINENT"
Life Insurance Company now has 50 MILLIONS of business written ending its first 18 months and shows an operating profit for the first half of 1959.
The CHARTER CONTRACT, an investment-savings-protection plan designed to keep you ahead of inflation is the key to this remarkable growth. (Limited offering—now ½ subscribed.)

A. T. SALVESEN
and Associates
POrtsmouth 7-6838
ESTATE PLANNING & INSURANCE INVESTMENTS
CHICAGO MIDWAY AIRPORT 4848 W. 63rd St.

Furniture, Carpet, Fabrics
Special low prices to ALPA.
Write, call with manufacturer's name and piece number.
Shipments made anywhere.
GEORGE H. BURCH
Moore Furn. Bldg.
191 N.E. 40 Street.
Miami, Fla.
Plaza 9-6671

Calling All Pilots
Your ATC clearance is ready— Now take your night clearance with GLO-PEN

Perfect for
- Pilots
- Navigators
- Doctors
- Nurses
- Executives
- Students

You'll never write with a finer ball point pen. Beautiful gold anodized finish. Glo-Pen is gift packaged, and costs only $4.95 post paid. Includes battery and bulb. Money back guarantee.
Send check, money order or cash to
PROUD PRODUCTS
2297 Kingsley Dr., Macon, Ga.

FRYE'S FAMOUS BOOTS

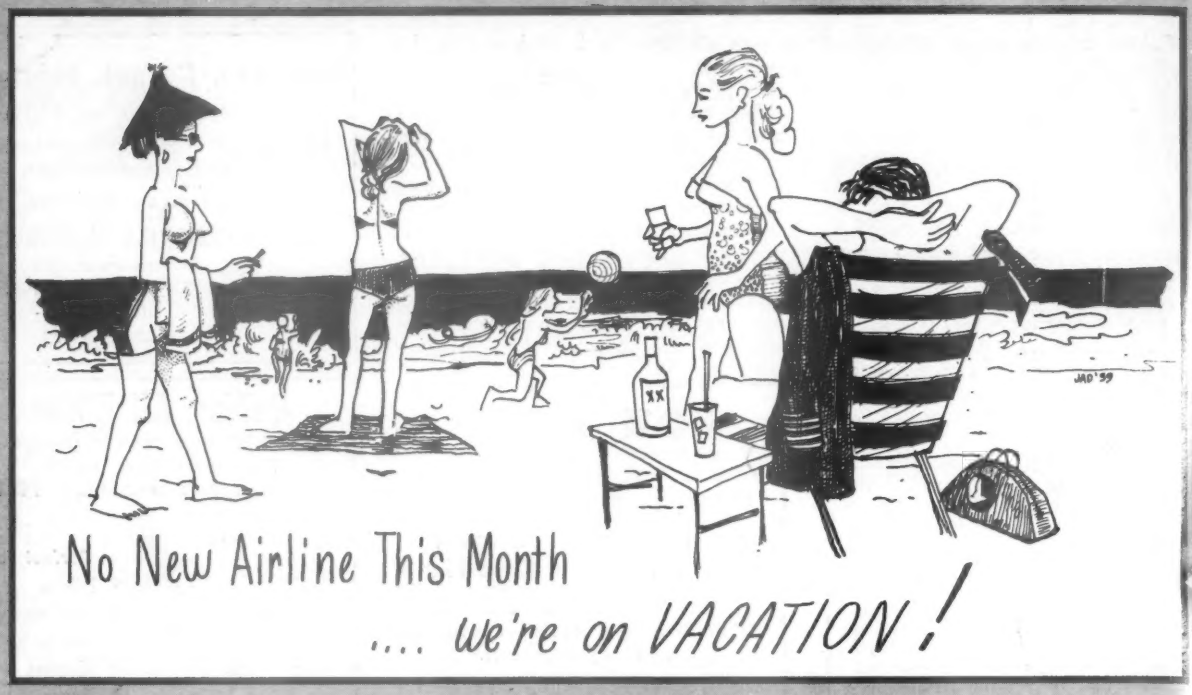
Fine quality
A real treat for your feet
NOW BY MAIL
Postpaid

Feather-light, yet durable. You will like their superb styling and wonderful flexibility.
9 inch JET wellington, $16.95. 7 inch strap and buckle jodhpur, $18.95. Fine BLACK or BROWN calfskin, fully lined, leather soles, rubber heels. Men's sizes 6-12, ABCDE, from stock. Other sizes 5-16, AAA-EEEE, made to order, $3.00 more. ORDER NOW. See below.

BATES OXFORDS AND CHUKKAS

Splendid Values
NOW BY MAIL
Postpaid

Nationally famous for durability and comfort.
Oxford, $13.95. Ankle-high Chukka, $15.95. Choice plump weight smooth BLACK leather uppers, neat medium toes, sturdy single leather soles, Men's sizes 6-13, BCDE. Also A and EEE oxfords. Satisfaction and fit guaranteed. ORDER NOW. Enclose check or money order . . . or stop in between flights and get them.
WRITE FOR FREE CATALOG
TODD'S, Dept. 8-AP, 209 S. State St., Chicago 4, Ill.



"The enrollment on the additional $25,000 coverage was very well received. Some airlines had more than 75% participation."

$25,000.00
(CASH, TAX FREE)

Airline Pilot Occupational Disability Insurance*

Non-Cancellable To Age 60

(A group plan only — Premiums are paid by Payroll Deduction — ask your ALPA chairman to contact us.)

This group plan will pay a pilot $25,000 cash, tax free, if he is permanently prevented from flying for his airline for physical reasons.

- **If your airline is listed below and you have been employed less than two years you are eligible without a physical examination.**
- **If you have been employed more than two years and are under 36 you may join by taking our physical examination from your Company Medical Department or FAA Doctor.**

Pilot Groups Insured

- AMERICAN AIRLINES
- BONANZA AIR LINES
- BRANIFF AIRWAYS
- CANADIAN PACIFIC AIR LINES
- CAPITAL AIRLINES
- CARIBBEAN ATLANTIC
- CONTINENTAL AIR LINES
- DELTA AIR LINES
- EASTERN AIR LINES
- FRONTIER AIRLINES
- HAWAIIAN AIRLINES
- MACKEY AIRLINES
- NEW YORK AIRWAYS
- NORTHEAST AIRLINES
- PAN AMERICAN-GRACE AIRWAYS
- PIEDMONT AIRLINES
- RIDDLE AIRLINES
- SEABOARD & WESTERN AIRLINES
- SOUTHERN AIRWAYS
- TRANS-CANADA AIR LINES
- TRANS-TEXAS AIRWAYS
- WEST COAST AIRLINES
- WESTERN AIR LINES

● UNITED STATES:
Aviation Insurance Agency, Inc.
Atlanta Airport — Atlanta, Georgia
CAPT. HARVEY W. WATT, Pres.

● CANADA:
Aviation Insurance Agency (Canada) Ltd.
P. O. Box 31, Islington, Ontario
CAPT. W. M. BENSON, Exec. V. P.

An additional $25,000 coverage is available to supplement the policy above.

*Copyright 1957